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The American Institute of Mining Engineers.

WILKESBARRE MEETING.

We present herewith a tolerably complete account of the proceedings at the first meeting of the new American Institute of Mining Engineers, held at Wilkesbarre, Pennsylvania, May 16, 17 and 18.

The preliminary session, held May 16, was briefly alluded to in our last week's issue. The proceedings were as follows:

Mr. R. P. ROTHWELL was unanimously elected Temporary Chairman and Mr. R. W. RAYMOND Secretary of the meeting. A committee was appointed to prepare rules for the Institute, and while they were absent, a list of the gentlemen present, desiring to become connected with the Institute, was prepared. Subsequently, while waiting for the report of the committee, the meeting listened to a paper from Mr. RAYMOND, on the Geographical Distribution of Mining Districts. [This paper contains much that has already been published at different times in our columns; and we have concluded to omit it.]

The Report of the Committee on Rules was then submitted, discussed and finally adopted in the following form:

1. The objects of the American Institute of Mining Engineers are to enable its members, comprising Mining Engineers and other persons interested in mining and metallurgy, to meet together at fixed periods for the purpose of reading papers upon and discussing subjects which have for their aim the economical production of the useful minerals and metals, and the safely and welfare of those employed in these industries, and to circulate among its members, by means of its publications, the information thus obtained.

2. The Institute shall consist of Members, Honorary Members and Associates. Members and Honorary Members shall be Mining Engineers. Associates to include other persons interested in Mining and Metallurgy. All these classes shall be equally entitled to the privileges of membership except as hereinafter provided.

3. The annual subscription of each member and associate shall be ten dollars, which shall be payable in advance at each annual meeting or immediately after his election.

4. Any member who shall make a donation of one hundred dollars, or upwards, shall become a Life Member; and any Associate who shall make a like donation shall become a Life Associate, and shall not be liable for any further annual subscription.

5. Honorary members shall not be called upon to pay any annual subscription. The number of honorary members shall not exceed twenty.

6. Persons desirous of becoming members or associates of the Institute shall be proposed by at least three members or associates, approved by the Council and elected by ballot at a regular meeting upon receiving at least three-fourths of the votes cast.

7. Every person proposed as an honorary member shall be recommended by at least ten members of the Institute, approved by the Council and be elected by ballot on receiving nine-tenths of the votes cast.

8. The officers who shall constitute a Council for the direction of the affairs of the Institute, shall consist of a President, who shall be a Mining Engineer, six Vice Presidents, at least four of whom shall be Mining Engineers (the words "Mining Engineers" in these rules comprehends Engineers connected either with Mining or Metallurgy), nine managers, at least six of whom shall be Mining Engineers, a Secretary and Treasurer. All of these officers shall be members or associates of the Institute and shall be elected at the annual meeting (except in the case of vacancies), and shall be eligible for re-election, with the exception of any President or Vice President who may have held office for the three immediately preceding years, and such two Managers of the Mining Engineers and one other Manager who shall have attended the fewest Council meetings during the past year, but such members shall be eligible for re-election after being one year out of office; and such election shall be made in the manner following: A.—Any member of the Institute shall be at liberty to nominate in writin, andg send to the Secretary, not less than thirty days prior to the annual meeting, a signed list of such persons as are considered suitable to fill the various offices; which list, having been duly stamped with the Institute seal, together with the list of such officers as shall be eligible for re-election, and a copy of this Rule shall be posted at least ten days previous to the annual meeting to all members of the Institute, who must strike out or add to such list so as to leave a record of their votes for Officers, not exceeding the number to be elected; but nothing shall prevent any member nominating in writing subsequently (specifying the classes as aforesaid), and up to, and on the day of, and prior to the election taking place, any other member or members to fill the various offices, nor shall anything prevent the members, whether present or absent, from having power to vote for any other member or members, although he may not be nominated as before provided for. The voting papers, being so filled up, must be returned through the post, addressed to the Secretary, or be handed to him or to the Chairman, in all cases so as to be received before the hour fixed for the election of Officers. B.—The Chairman shall, in all cases of voting, appoint Scrutineers of the Lists, and the scrutiny shall commence on the conclusion of the other business of the meeting, or at such other time as the Chairman may appoint. On the conclusion of the scrutiny, the voting papers shall be destroyed, and the List, prepared and verified by the scrutineers, shall be kept until the next annual meeting. C.—In the event of any vacancies occurring in the number of officers subsequent to the annual meeting, such vacancy or vacancies shall be filled by the Council. D.—At meetings of the Council, five shall be a quorum.

9. General meetings of the Institute shall take place on the third Tuesday of February, May, August and November, and the May meeting shall be considered the annual meeting, at which a report of the proceedings of the Institute and an abstract of the accounts shall be furnished by the Council. Special meetings may be called whenever the Council see fit; and the Secretary shall call a special meeting on a requisition signed by fifteen or more members. The notices for special meetings shall state the business to be transacted, and no other shall be entertained.

10. Every question which shall come before any meeting of the Institute shall be decided by the votes of the majority of the members then present.

11. The funds of the Institute shall be deposited in the hands of the Treasurer, and shall be disbursed by him according to the directions of the Council.

12. All papers sent for the approval of the Council shall be accompanied by a short abstract of their contents.

13. The Council shall have the power to decide on the propriety of communicating to the Institute any papers which may be received, and they shall be at liberty, when they think it desirable, to direct that any paper read before the Institute shall be printed in the Transactions. Intimation, when practicable, shall be given at each General Meeting of the subject of the paper or papers to be read, and of the questions for discussion at the next meeting, and notice thereof shall be posted to all members. The reading of papers shall not be delayed beyond such hour as the President shall think proper, and if the election of members or other business shall not be dispatched soon enough, the President may adjourn such business until after the discussion of the subject for the day.

14. Members elected at any meeting between the Annual Meetings shall be entitled to all papers issued that year.

15. The copyright of all papers communicated to and accepted by the Institute shall be vested in it, unless otherwise agreed upon between the Council and the author; and such communications shall not be published for sale or otherwise, without the permission of the Council.

16. All proofs of discussion forwarded to members for correction must be returned to the Secretary not later than seven days from the date of their receipt, otherwise they will be considered corrected, and printed.

17. The Institute is not, as a body, responsible for the facts and opinions advanced in the papers which may be read, nor in the abstracts of the conversations which may take place at the meetings of the Institute.

18. The author of each paper read before the Institute shall be allowed twelve copies of such paper (if ordered to be printed) for his own use, and shall have the right to order any number of copies at the cost of printing and paper, provided they are not intended for sale.

19. Any member of the Institute shall have power to introduce a stranger to any meeting, but the latter shall not take part in any discussion, without the consent of the meeting.

20. Any member who has not paid his subscription for the space of one year after it is due, shall not be entitled to vote at elections, or to receive a copy of the Transactions of the Institute.

21. The place of holding the general meetings for the ensuing year shall be fixed at each annual meeting, by a vote of the Institute; or, in default of such determination by the Institute, the place for all meetings shall be fixed by the Council; and notice of all meetings shall be given by mail or otherwise to all members and associates, at least twenty days before the time appointed for said meeting.

22. No alteration shall be made in any of the Laws, Rules or Regulations of the Institute, except at the annual meeting.

It was then resolved that all persons who had already subscribed their names, and all persons elected at the present Wilkesbarre meeting, shall be considered associates; and that the Council shall submit at the August meeting the names of such persons in two lists as members and associates respectively, for the ratification of the Institute. Persons desiring to be ranked as members (i. e. professional engineers) or associates, were requested to communicate hereafter on the subject with the council.

A committee was appointed to receive names of persons desiring to become connected with the Institute, and the meeting adjourned.

The second day was spent very agreeably in visits to various points of interest in and around Wilkesbarre. One of the largest parties went to Pleasant Valley to see the new breakers of Mr. J. H. SWOYER and of the Lehigh Valley Company, the latter under the charge of Mr. FREDERICK MERCUR. The internal arrangements of both these breakers were subjects of much attention and praise on the part of the engineers present.

In the evening a session of the Institute was held in the club-room at the Wyoming Valley Hotel at which officers were elected [See subjoined list].

In the absence of the new President, Mr. RAYMOND took the chair; and after business matters had been concluded, Mr. R. P. ROTHWELL presented a paper on the Waste of Coal in Mining in the Anthracite Regions, of the United States of which the following is an abstract:

WASTE IN COAL MINING, ETC.

At this our first meeting I beg to call the attention of the members of our Institute to what is certainly a question of the greatest possible importance to the industries we represent; and more particularly to the welfare of the Coal and Iron trades: I refer to the enormous waste of coal in mining and in its preparation for market, as now practised in our anthracite coal fields. It is a fact which many of you can certify to, that we are wasting fully *one half of all the coal in the veins we are now working*, and there are cases, which might be mentioned where this proportion, immense as it is, has been greatly exceeded.

The popular belief that our deposits of anthracite coal are "practically inexhaustible," is very far from being founded on facts. On the contrary, supposing the present rate of increase in the production to be maintained, it is probable that a maximum yield for our coal fields would be attained in about fifteen years; there are in fact some of our smaller basins where the principal veins are nearly exhausted and the production has already attained its maximum. There are others, again, where the depth attained—and it must be borne in mind that we commenced working at the surface outcrop—that the depth attained, moderate though it is, (scarcely ever reaching 800 feet,) has so increased the cost of mining as to imperil the capital invested in them, and though it requires but little foresight to predict the time when the difficulties of mining will be very considerably increased by reason of the greater depth, greater quantity of water, fire-damp and other fruitful sources of cost, yet ignoring these recognised facts, we continue to waste more than one half of the coal where it is obtained with the least danger, expense and trouble, that is, near the surface—either above water-level or at a moderate depth below it.

The inspection of almost any accurate mine map will satisfy you that, on an average, we leave fully one third of the coal in the ground as pillars to support the roof; in some places more than one-third thus remains, while it is very rare that less than one-quarter is left. In almost every case this coal is absolutely lost, for it will very rarely pay to re-open gangways and lay roads to it after that portion of the mine has been abandoned. Is it necessary in all cases to support the roof, and where it is, may not some artificial support, stone or iron—for wood appears too perishable—be found cheaper than coal at certain depths? But in addition to this source of waste we have another which, though not so great in per cent. yet attracts much more attention, and is in reality much greater than has generally been supposed, that is, the loss in breaking up the coal for the market. The mounds of "culm," or "coal dirt," which we meet with at every step in our mining districts, testifies sufficiently to the amount of this waste, and the loss of coal from these two sources amounts to fully as much as our shipments to market, or say about 15,000,000 tons per year at present! This is a condition of things which, as engineers, as individuals interested in the industries whose welfare our organization is intended to advance; or as citizens, having the prosperity of our country at heart, we should not allow to continue till we had exhausted every available means for improveme

The question naturally forces itself on us, is there such a waste in coal mining in other countries, where veins as large, as highly inclined, and otherwise as difficult to work as ours,

are mined; and if not, cannot their systems of mining, or some modification of them, be applied here, to advantage?

The system of leases under which the operator pays for coal shipped, but not for coal wasted, and for the larger sizes frequently a larger royalty than for the smaller sizes, greatly aggravates the evil. When the leases are, moreover, for short periods, the combination of conditions is most mischievous. It then makes no difference to the lessee how much coal is wasted or left in the ground. His efforts are directed to getting to market as much coal of the most saleable sizes in the given time.

The proper plan in my estimation would be to have the leases so drawn that the operator would pay for coal a certain sum per foot in the vein, instead of paying by the ton shipped. I think also that the breaker system could be improved. In fact, in the breaker which the members have visited (Mr. SWOYER'S), provision has been made for separating at the outset the coal which does not need to pass the rolls.

Mr. ROTHWELL concluded with a recommendation that a committee be appointed to consider this subject, and report at a future meeting of the Institute.

A highly interesting discussion then arose, in which Messrs. DADDOW, SWOYER, HOFFMAN, TIMPSON, MERCUR, and the CHAIRMAN participated. The following brief notes indicate the scope of the debate:

Mr. SWOYER showed that the cost of land on the surface interferes with the long-wall system. He explained that in the Wyoming region the tendency was towards permanent leases, so that the tenant regarded the coal as his own, since he had, in fact, bought it, but paid in instalments instead of cash down. He complained of the whims of consumers as to uniform sizes of coal, asserting that this was the only reason of the great investment of capital, and the great waste of coal in the breakers. Combined with short leases, this state of things produced much mischief. If he had a short lease of a coal mine, and, for some reason, small sizes were to bring a relatively high price in market, he would naturally convert all his coal to small sizes, in spite of the actual waste, because of the present financial profit. Under a long lease, on the other hand, he could afford to consider the ultimate value of the coal. He thought the best arrangement between owners and operators would be to pay the royalty on the coal as it was raised, before it was prepared.

Mr. DADDOW believed he could suggest a plan by which long-wall could be carried out, even in pitching seams.

Mr. HOFFMAN reviewed the paper of Mr. ROTHWELL at some length. He thought it possible to retain the pillar and chamber system of mining. It might come to be a serious question whether the small villages over coal mines were worth the reservation underground of so much coal to support them. He was not aware of a higher royalty being paid for one size of coal than another. He thought the general adoption of long leases would improve the economy of coal mining more than any other simple remedy—the operator to mine so many tons per year, and observe proper rules of working.

Mr. ROTHWELL replied that in the Wyoming region the lessees often actually paid less royalty for chestnut and the smaller sizes than for lump or steamboat coal.

The CHAIRMAN called attention to the difference between actual and economical exhaustion of mines, as illustrated in recent discussions as to the duration of English coal mines. Economical exhaustion might take place long before the mineral was all extracted, simply by reason of increased expense. It did not follow, because of the abundance of coal in the anthracite regions, that a reckless waste of it would not bring about in many cases a premature economical exhaustion. Just as soon and as long as a mine could not be profitably worked, it was practically exhausted. Moreover, mineral wealth was given to a country but once. Such resources would not grow again, like fertility of soil or abundance of timber. With regard to the particular case under consideration, he had no doubt the Council would appoint a committee to consider it, and report deliberately upon it. Hasty theoretical recommendations were of little benefit. It was clear that we must suggest something feasible, and not commercially ruinous, to our friends the operators, or else our talk about their waste would be fruitless. He had been a strong partisan of the long-wall system; but he must frankly admit that he saw many difficulties in the way of its employment in large "pitching" seams, and in localities where, of several workable seams, the lowest was at present working, because it was, by reason of greater thickness or better quality, or any other circumstances, the most profitable. Villages on the top might in time decay, by the suspension of the mines which support them in a double sense. Cases of the sudden rise and fall of mining towns in the West were given. On the whole, the present system of mining in the anthracite regions, bad as it was, was a system hanging together, and much study would be required to suggest practicable amendment.

The adjournment took place at a late hour.

The next day was most profitably spent, like its predecessor, in excursions about the lovely Wyoming valley, favored by glorious Spring weather. A large number of the members, under the guidance of Mr. J. A. TIMPSON, visited the great planes of the Lehigh and Susquehanna Company, at Ashley, and were drawn up the giddy inclines to the top, whence they returned by way of the regular track to Wilkesbarre, stopping by the way to scramble up the celebrated Prospect Rock, and survey the wide expanse of field, forest, town, village, river, and mountain, spread before them in tranquil beauty.

Another visit of great interest was that which a small party made to the rooms of the Wyoming Historical Society, where Mr. MARTIN CORYELL "did the honors" with equal courtesy and intelligence. This society's collections are valuable, and in many respects unique. It is to be hoped that they will find ere long a more commodious store-house, where they can be so displayed as to awaken the attention and admiration they deserve.

In the evening, a large and interesting session was held, at which two papers were presented on the subject of mine ventilation, the first by Mr. S. HARRIES DADDOW, and the second by Mr. DANIEL HOFFMAN. [Both these papers are given in full in other columns.] After the reading,

The CHAIRMAN remarked that these papers brought before the meeting in a remarkably comprehensive way, the subject of ventilation, Mr. HOFFMAN having presented a plain summary of present practice, and Mr. DADDOW having advocated a novelty. A lively discussion then sprang up, relative to the latter paper.

In reply to a question by a member, Mr. DADDOW said that the plan which he recommended for working pitching-seams was simply "the long-wall system shortened." He did not claim the use of his fan as essential to his invention. Any other fan could be used, but would in his opinion give less economical results. His fan would give a pressure of ten pounds to the square foot, which was double the pressure attainable by the use of an ordinary fan.

Mr. ROTHWELL said that five pounds was the pressure of a very poor fan indeed. The only accurate test was that of the percentage of useful effect. He thought the increased size of opening in the side of the fan a matter of little importance. The openings in our fans were already large enough. He doubted whether the arrangement proposed of two auxiliary fans would give as much useful effect as the three fans separately.

The CHAIRMAN alluded to the amount of friction in the flues proposed by Mr. DADDOW, and suggested that the gas, when mixed, even in explosive proportions, with common air, would not greatly reduce the specific gravity of the latter, and that "ascensional tendency" could not be relied upon. He thought there would be a stagnation in the remote chambers.

Mr. WILLIAMS inquired how the proposed plan would be applied to the first upper gangway, and how loose ground or quicksand would affect it.

Mr. ROTHWELL said, another objection was the irregularity of the seams. A hole drilled from one level to another would not be always along the roof, so as to afford a ventilating flue to the miner. It would frequently be many feet away from the coal, sometimes in the roof and sometimes in the floor.

Mr. DADDOW explained that there was always considerable difficulty in inaugurating a system of ventilation, and he did not claim that his was an exception in this respect. He said that if the hole bored was in the roof, the ventilation could still be easily secured; but if it was in the floor, this would be more difficult.

Mr. ROTHWELL spoke of the great friction which would arise when air was conducted through the small tubes proposed. It could easily be calculated; and, though he had not made any such calculation, he thought the result would be unfavorable to the plan.

After an animated debate, the subject was dropped, and a paper by Mr. R. W. RAYMOND, of New York, on the Relation of the Speed of Stamps to their Effectiveness in Crushing Rock, was read by the author. The tendency of this paper was in favor of light stamps and frequent blows, as giving, in most cases, a greater amount of effective work per horse-power developed by the fall of the stamps. This view was supported by a discussion of the results obtained in a large number of stamp-mills. In conclusion, the author alluded to the extra expense of new patterns in manufacturing machinery, the disinclination of manufacturers to depart from their established models, and the carelessness of mine-owners in purchasing machinery ready-made or at second-hand, as incidental obstacles to the discovery and adoption of the best proportions and arrangements. Several members remarked that these obstables existed as well in the coal-regions as in the gold mining districts.

The lateness of the hour terminated the discussion, and the meeting adjourned.

During the evening, the CHAIRMAN announced the appointment by the Council of the following Committee on the Present Waste of Coal in Mining, to report at a future meeting of the Institute: Messrs. E. B. COXE, T. S. MCNAIR, DANIEL HOFFMAN, E. GAUJOT, R. P. ROTHWELL, and W. B. HICKS. This committee represents the three great divisions of the anthracite field, and the ability of its members justifies the expectation that its report will be one of great practical importance.

The subject of a place for the next meeting was left to the decision of the Council.

The following is the present list of officers and members:

PRESIDENT.

David Thomas, - - - Catasaqua, Pa.

VICE-PRESIDENTS.

R. W. Raymond, - - - New York, N.Y.
E. B. Coxe, - - - - - Drifton, Pa.
W. R. Symons, - - - - Pottsville, Pa.
W. P. Blake, - - - - New Haven, Conn.
J. F. Blandy, - - - - Philadelphia, Pa.
J. H. Swoyer, - - - - Wilkes-Barre, Pa.

MANAGERS.

R. P. Rothwell, - - - Wilkes-Barre, Pa.
T. S. McNair, - - - - Hazleton, Pa.
G. W. Maynard, - - - - Troy, N. Y.
Raphael Pumpelly, - - Cambridge, Mass.
Thos. Petherick, - - - - Scranton, Pa.
T. M. Williams, - - Wilkes-Barre, Pa.
Thomas Egleston, Jr., - - New York, N. Y.
E. Gaujot, - - - - Pottsville, Pa.
Fred. Prime, Jr., - - - - Easton, Pa.

SECRETARY.

Martin Coryell, - - - Wilkesbarre, Pa.

TREASURER.

J. Pryor Williamson, - - WilkesBarre, Pa.

NAMES OF MEMBERS NOW RANKED AS ASSOCIATES.

Thomas Petherick, - - - Scranton, Pa.
W. R. Symons, - - - Pottsville, Pa.
Thomas S. McNair, - - - Hazleton, Pa.
Daniel Hoffman, - - - Pottsville, Pa.
S. H. Daddow, - - - - St. Clair, Pa.
Thomas M. Drown, 209 S. 6th St., Phila., Pa.
J. H. Bramwell, - - - Dunbar, Pa.
Willard P. Ward, 37 Park Row, New York, N. Y.
Ernest Gaujot, - - - Pottsville, Pa.
Ogden Haight, Columbia College, New York, N. Y.
R. C. Neal, - - - Bloomsburg, Pa.
J. M. Silliman, - - - Easton, Pa.
Henry S. Drinker, 1906 Pine St., Phila., Pa.
Fred. Mercur, - - - Wilkes-Barre, Pa.
W. B. Hick, - - - Wilkes-Barre, Pa.
T. M. Williams, - - - Wilkes-Barre, Pa.
Lewis S. Jones, - - - Wilkes-Barre, Pa.
R. P. Rothwell, - - - Wilkes-Barre, Pa.
R. W. Raymond, - - - New York, N. Y.
James A. Timpson, - - New York, N. Y.
James Thomas, - - - Wilkes-Barre, Pa.
Wm. H. Sturdevant - - Wilkes-Barre, Pa.
Robert Allison, - - Pottsville, Pa.
Jesse Beadle, - - - Shickshinny, Pa.
John F. Blandy, 410 Walnut St., Philadelphia, Pa.
A. B. de Saulles, - - - Minersville, Pa.
David Thomas, - - - Catasaqua, Pa.
Samuel Thomas, - - - Catasaqua, Pa.
Eckley B. Coxe, - - - Philadelphia, Pa.
G. W. Maynard, Rensselaer Inst., Troy, N. Y.
W. P. Blake, - - - New Haven, Conn.
I. A. Stearns, - - - Wilkes-Barre, Pa.
Raphael Pumpelly, - - Cambridge, Mass.
David Coghlan, - - - Scranton, Pa.
T. Egleston, Jr., School of Mines, New York, N. Y.
F. Prime, Jr., - - - - Easton, Pa.
P. Frazer, Jr., - - - Philadelphia, Pa.
J. H. Swoyer, - - - Wilkes-Barre, Pa.
Martin Coryell, - - - Wilkes-Barre, Pa.
Wm. B. Potter, School of Mines, New York, N. Y.
Wm. D. Zehner, - - Summit Hill, Pa.
S. B. Whiting, - - - Pottsville, Pa.
Wm. M. Courtis, - - Wyandotte, Mich.
A. Eilers, - - - 37 Park Row, N. Y.
J. R. Hoffman, - - - Pottsville, Pa.
C. W. Parsons, - - - Wilkes-Barre, Pa.
W. W. Kenrick, - - - Pittston, Pa.
F. Koerner, - - - Wilkes-Barre, Pa.
Morgan B. Williams, - - Wilkes-Barre, Pa.
J. W. Thomas, - - Wilkes-Barre, Pa.
J. H. Harden, - - - Wilkes-Barre, Pa.
J. Pryor Williamson, - - Wilkes-Barre, Pa.
C. E. Richter, - - - Wilkes-Barre, Pa.
R. Bruce Ricketts, - - Wilkes-Barre, Pa.
T. P. Jenkins, 247 Canal street, New York, N. Y.
Edwin Pechin, - - - Dunbar, Pa.
E. B. Ely, - Trinity Building, New York, N. Y.
John White, Trinity Building, New York, N. Y.
Arthur McClellan, - - - Drifton, Pa.
N. Friederich, - - - - Drifton, Pa.
George Johnson, - - - Pittston, Pa.
William L. Stewart, - - Wilkes-Barre, Pa.
John Hosie, - - - - Tamaqua, Pa.
Wm. H. Roberts, - - Mauch Chunk, Pa.
C. E. Hawley, - - Wilkes-Barre, Pa.
H. Wentz, - - - Wilkes-Barre, Pa.
Charles Parrish, - - Wilkes-Barre, Pa.
P. A. Oliver, - - - Wilkes-Barre, Pa.
Fred. B. Parrish, - - Wilkes-Barre, Pa.
William Coulter, - - - Ashley, Pa.

A New System of Mine Ventilation.*

THE best methods of mine ventilation rest on the same principles as those of domestic ventilation. Whether we use the furnace, now almost and most fortunately out of use, or the *fan*, which is taking its place, to the great advantage of good ventilation, the action is the same, and a parallel case is not difficult to draw.

The great evils of our domestic ventilation are the prevailing evils of our mine ventilation also; but in addition to the vitiated air of respiration, condensation, combustion, etc., we have to contend with the spontaneous exhalation of carburetted hydrogen from the coal, in most of our deep mines; and in this constant and abundant generation of one of the most dangerous of explosive gases lies the chief difficulty and danger of our mining economy.

Still in the cure of the first great evil of our present system of ventilation, we find the remedy even for this; because here again the great laws of nature become available, or the provisions of nature suggest the remedy. Like heated air, carburetted hydrogen only needs the means of escape. Its tendency to fly upward is about equal to that of air heated to 500° of temperature; consequently, if permitted to escape from the mines freely, this dangerous and now troublesome gas would not only become harmless, but might be made useful. Instead of a bad master, it might become a good servant.

But this consummation is impossible as long as our mines are ventilated on the principle of too many of our houses; and just here a parallel case may be drawn. We may compare a common chamber, or breast, or the face of a gangway, with the rooms of our dwellings, having only the flue of the stove or fireplace, perhaps but four or five feet from the floor, for the escape both of the vitiated air of respiration and the products of combustion. Of course, above the point where the flue exists, the space is a receptacle for heated air, which, as long as it retains a certain degree of heat or rarefaction, will occupy this area with all the impurities of respiration and combustion common to such dwelling rooms, where there is no provision made for their exit by means of escape flues in the upper portion of the walls.

In a mining chamber, particularly when the coal-bed is a "pitching" one (having a large angle of dip), there must always be a considerable space beyond the influence of the air currents; and this dead or stagnant place in all such chambers is always the highest portion. In this portion, corresponding to the upper part of a dwelling-room, the miner pursues his daily avocation; and here of necessity, in most of the chambers of a pitching coal-bed, he is compelled to work in foul air, and too frequently in an atmosphere of inflammable gas, simply

* A Paper, read May 18, 1871, before the American Institute of Mining Engineers, at Wilkesbarre, Pa., by S. HARRIES DADDOW, of St. Clair, Pa.

because it is impossible, in most cases, to make the air-currents pass along the face of the chamber in order to provide pure air to the miner and to carry off the gases that exhale from the coal.

To those familiar with our methods of ventilation, this proposition is plain, because we now carry the air-currents from chamber to chamber, by means of cross-headings through the pillars which separate the chambers. Such cross-headings are always considerably in the rear of the "working face" of the chamber. Even if commenced close to the face, the face is constantly being advanced, further and further from the cross-heading, through which the air-current passes, leaving the space in advance in a stagnant condition.

If the air is carried up on one side of a chamber and down the other, this same difficulty exists, unless there is a sufficient amount of "gob" to keep the middle of the chamber closed up near to the working face. This is scarcely ever the case; and the only other way in which the air-currents can be made to pass close to the face, is when the "rear" method is made use of. But this method is seldom available and still more rarely desirable.

If we take the case of a gangway, or the main entry, with its parallel air-way, we find the same difficulty to exist, because here, as in the chamber, or the dwelling, there must always be a space in which stagnation exists, where the air-current cannot be made to pass, and where the gas will accumulate in any mine generating carburetted hydrogen.

The space in advance of the heading is always in this stagnant condition, unless air is supplied to the face by the small hand fan, which is often employed under such circumstances, unless the gases are abundant.

Thus our present system of ventilation is powerless to reach the vital point. It cannot pass the air-currents where pure air is most wanted. It is always behind, too low, or too far off from the miner; and he is consequently compelled to work in a vitiated atmosphere, or worse, in an atmosphere of fiery elements. But here, as too often in our dwellings, we ignore a law of nature, and complain of the dangers to which we are compelled to submit, as if those dangers were also the result of inexorable, unchangeable laws.

If our analogy has been fairly made, natural ventilation will appear to be the same in the house as in the mine; but it appears to be more difficult to provide for the free escape of the gases of the mine than of the heated air of the dwelling. We have not, however, prepared this paper merely to present difficulties with which we are, unfortunately, too familiar; but confidently offer a method which we believe will prove a remedy as available as it is in every way desirable.

ARTESIAN OR FLUE VENTILATION.

This innovation, which we will now try to present as briefly and concisely as possible, the writer claims as his invention, and presents it as such without hesitation, feeling confident of its practical utility, both in regard to safety and economy.

The invention consists, first of a drilling machine, to be propelled by steam, compressed air, or water, which is light, strong, portable and easily operated. This drilling machine is designed to make flues from each chamber to the return air course, or in other words, *to drill holes in the place of cross-headings* for the escape of the gases and foul air from the chamber in front of the miner, just as the flues in the upper part of a room allow the heated air to escape naturally.

The author then exhibited a photograph representing the drilling machine in its smallest and lightest form; but a double machine is designed to bore long flues, say from 300 to 500 feet.

The operation or cost of boring these flues from gangway to gangway, or from airway to airway, either on the dip of the coal-bed, or parallel to its strike (that is, at right angles to or parallel with the gangways), is a small matter compared with the cost of the frequent cross-headings now necessary, but dispensed with when the flues are substituted. Cross-heading is slow and costly; but the act of boring these flues through the coal is rapid and comparatively cheap. From 10 to 20 feet per hour can be made by the machine drill with two men, while a yard per day is about the average advance made in the cross-heading. It may be argued that a flue six inches in diameter would be insufficient for the purpose designed; but when we calculate the amount of air or gas, or both combined, that will pass through such a flue, we find even four inches ample for the ventilation of a single chamber.

These flues always lead from the chamber to the return air-course. They empty in the return; consequently, the suction of the fan is constantly exerted on the area of the flue, inducing rarefaction and a rapid current in the flue, and from the chamber. This flue is in the solid coal always in advance of the chamber. In fact, the chamber follows the flue; so that the escape of the gas and foul air is directly in front of the miner and away from him; while the natural lightness or ascensional tendency of the gas is thus made available, not only to make its own exit, but to carry away in its train other evils.

Every chamber is thus ventilated through an independent flue. The gas and vitiated air are drawn off directly from the locality in which they are generated. If the flue ascends, the gas would rush up of its own lightness, but when the flues are nearly horizontal, the suction or draw of the fan has the same effect on the foul air and gases. The fan, or some other mechanical means of drawing a current of air through the mines, is now always used, whether the beds are horizontal or inclining, consequently this power is always exerted to induce a current in the flues, just as the current is drawn through the heading at present. Of course, if the gas and foul air are drawn out of a chamber, the pure air will fill its place, because "nature abhors a vacuum," and an abundance of pure air is provided in all the main gangways and in all the chambers, which are constantly open for its free entrance, without doors, or batteries or other diversions.

The flues thus convert the carburetted hydrogen from a dangerous gas to a useful element, while the miner may work fearlessly in his chamber, not only well rid of a lurking enemy, but in an abundance of pure air and *light*, because the naked, blazing lamp may be used where the dim light of the safety-lamp is frequently now all that the miner dare risk.

In addition to the difficulty—or, in fact, impossibility—of providing pure air to each miner, in the face of his chamber, by the cross-heading method, on account of the tendency of the gas to remain inside or above the headings, another serious evil exists in the mode of carrying the air-currents in large volumes, from chamber to chamber, through the mine. The gathering impurities go with the current, and pass from one miner to the other. Every opportunity is given to produce an explosive element, and nothing but an excess of pure air can prevent it in a gaseous mine. Consequently, thirty thousand cubic feet of pure air is necessary to ventilate, by the present method, where five thousand cubic feet is ample by the flue method, because it requires ten times more pure air to render the gas innoxious, than to supply the necessary air for the use of the workmen.

The simple use of the flue, always in advance of the work, thus provides perfect ventilation, and immunity from the dangers of explosive gases.

It may now be a question of practicability and relative economy between the present and the proposed methods.

PRACTICABILITY.

The question of practicability lies simply in our ability to drill long holes in any direction through the coal; but we know, by actual experience, that a horizontal hole three hundred feet long can be drilled in *hard rock* by machinery less available than the drill now proposed. We know that coal can be drilled in any direction, or at any angle, at the rate of from ten to twenty feet per hour; and should the top or bottom rock be met by any undulation of the bed, the diamond drill employed will pass through it. The flues may be drilled from the upper levels downward to the lower levels, or from the lower levels upward to the upper levels; but, while the flue-method applies as well to the right angle blast or chambers, up the dip of the bed, we prefer, for many reasons, the *barrel-chambers*, which are driven at right angles to the dip, or parallel with the gangways. In such chambers, the flues are bored horizontally, and with the course of the gangway or the "strike" of the bed.

RELATIVE ECONOMY.

If we ignore entirely the many and great advantages secured in pure air and immunity from danger by the use of the artesian flues, and only compute the relative cost of boring flues and of driving cross-headings, we think no one would complain of unfairness.

We will take the simple case of a gangway, with its parallel air-way, and calculate that a cross-heading is driven between the two, a distance of 21 feet, at a cost of five dollars per yard, or thirty-five dollars; while a single flue, six inches in diameter, could be bored in two hours, costing less than five dollars, if steam or compressed air is used, and less than one, if water from the pumps is used as the motive power. In some of our gangways, where the gases are generated rapidly, a cross-heading is required every twenty feet; but from thirty to fifty feet may be more nearly the average distance from one cross-heading to another, either in gangway or chamber. We may calculate that every thousand yards of gangway or chamber will require from 100 to 150 yards of heading. By the flue method, the length of the flue is equal to the length of the chamber; consequently, in ventilating the chambers by this method, the length of the flue will be from seven to ten times the length of the cross-heading; while in the gangways the length of flue would be equal to the length of cross-heading, and no more. But ten yards of flue can be drilled at much less cost than one yard of cross-heading can be driven. On the whole, we think the cost of the flues would only be about half the cost of cross-heading as usually practiced; but we are willing to allow that the cost in this respect may be equal, including the cost of outfit, general maintenance, power, and operation. Still, should there be no actual economy in the relative cost of driving headings or of boring flues, we accomplish a desirable purpose with the one which cannot be obtained by the other. We secure life, health, and safety, for which we now pay a *premium;* because we cannot expect a man to assume these risks for mere laborer's pay. Nor can we expect as much labor from a miner working in constant danger, if not in actual dread, as from one who feels secure and works without apprehension. Moreover, there is less professional skill required in the mere act of digging coal than experience, hardihood, and fearlessness in meeting and managing the dangers of our imperfect systems of mining and ventilation.

In the artesian flue system there is also a saving and convenience in dispensing with all doors, batteries, hand-fans, safety lamps, and fire-bosses. The system is plain, simple, cheap, and applicable to all good systems of mining.

FLUE PIPE EXTENSIONS.

When an air-way, incline, shute, or heading, is driven at points where the artesian flue cannot be bored, a system of sheet-iron pipes, made and put together on the principle of large stove-pipes, is used. Those pipes are fitted into an artesian drill-hole, extending from the gangway into the parallel air-way, and from thence the pipes are carried in any direction or angle, in one of the upper corners, or any place on top of such headings, etc., as are now supplied with air by the hand-fan. The suck of the fan on the mouth of the flue, and consequently on the flue-pipe, will draw the air up, or into such heading, by exhausting the gas and vitiated air from its face.

It is evident that an artesian flue cannot be bored so as to ventilate the main gangways, close up to the face. It is true that these holes may be bored quite close to the face, and much more frequently than cross-headings are now used, and would, therefore, carry the air much closer to the face than would otherwise be done; but, in order to secure a constant supply of pure air, the pipe-flues can be extended up to the face of the gangway, and the opposite end inserted in one of the artesian holes leading to the return air-way.

In connection with this system of artesian flue ventilation, and the drilling machinery which necessarily accompanies it, I have also constructed a suction fan on new principles, in order to get increased suction or drag in the return air courses, and consequently in the flues, and for the further purpose of reducing the dimensions, or rather diameter of the artesian flues as much as practicable.

In order to create greater suction-power, I found it necessary to provide some means of preventing depression, and at the same time increasing the diameter of the side openings, which, under ordinary rules, would defeat the ends sought. But this desirable improvement I at length secured by using three fans in combination. The ordinary fan, as now used, is introduced, with a double cone around the shaft, the smaller ends on the line of the shaft or axis, and the bases joined together at the bases of the wings, thus diverting the air from the horizontal to the vertical line with the least possible friction or tendency to counter-action. But, in addition to this, I place a hub or extension at each side, and in these I place two fans, one on each side, with oblique vanes, on the principle of the anemometer, whose whole object and action is to suck the air in at either side. Of course, I can increase the size of the side openings in this fan to double the size possible on the old plan, because depression is simply impossible; and I thus obtain a plain, simple fan that will do double the work that can be accomplished by any other suction fan.

The system of ventilation herein proposed, however, is entirely independent of this new style of fan, which is not a necessary adjunct, but only a means of reducing the flues from six inches to four inches diameter. The common fan or the furnace can be used in connection with the flues just as they are used at present. No change in our modes of mining is actually necessary, though the hand system is recommended as the most available, under all circumstances, both as to economy of mining and as to ventilation.

In this method the air invariably enters through the main gangways, passing up into the chambers, only as fast or in such volumes as can be carried off by the respective flues. Exhausted or worked-out chambers are closed, and the inside air-course, communicating from the lower to the upper level, is provided with a regulator to pass off the surplus air, and insure a sufficient quantity to each chamber.

The Iron Mines of Lake Superior.

THE following interesting facts are from the forthcoming work on the history of the iron deposits of Lake Superior, prepared by A. P. SWINEFORD, Esq., editor of the Marquette *Journal:* It is not more than twenty-five years since the first iron ore was taken from what is known as the Jackson location, and less than half a ton of it packed upon the backs of half-breeds to the mouth of the Carp, and from thence transported in canoes to the St. Mary's river, only to be pronounced worthless upon its arrival at Detroit. Yet in that short interval the development of our mines has been so rapid that they now contribute the ores from which is made more than one-fifth of all the iron manufactured in the United States. Less than a quarter of a century ago the district which now supplies the ore for a hundred and fifty furnaces, and which boasts a population of not less than fifteen thousand people, was an unexplored wilderness, never penetrated save by the wild Indian and devoted missionary. Little did our venerable citizen, P. M. EVERETT, Esq., imagine when, in 1845, he visited this place and carried away the first specimens from what is now Jackson Mine No. 1, that he would live to read the report of shipments—over a million tons in 1870. More than this, the developments of the past year render certain a largely increased product for 1871.

The iron ores of this district are generally found in hills, rising from one to five hundred feet above the level of the surrounding country. These hills (those given to exaggeration call them mountains) are simply immense deposits of iron ore, though partially or wholly covered by layers of earth and rock. It is true, they are also found in the valleys, but where so found are usually covered with a deep drift, and consequently cannot be so easily mined.

That part of the Lake Superior iron region in which the most gratifying results have been obtained, is all included within the limits of Marquette County, west of Negaunee, within the range of six miles wide, running in a northwesterly course from Lake Fairbanks, in Town 47 N., of Range 26 W. to Keweenaw Bay in Town 49 N., of Range 38 W.—a distance of nearly one hundred miles. The mines now opened and being worked are all situated on the east end of the range above mentioned, the most remote being the Champion, near the shore of Lake Michigammi.

Another extensive district is that known as the Menominee, extending, so far as known, from the south part of Town 40, on both sides of that river up to its headwaters at Lake Michigammi. The deposits in this district are not only numerous, but said to be very rich and valuable, though as yet nothing has been done toward their development. The iron range again crops out some thirty miles south of Bayfield, where ore of tolerably pure quality has been found. By reference to a geological map, it will be seen that the Marquette and Menominee iron ranges cross each other upon the south side of Lake Michigammi, the one continuing to the west and north-west, and the other southward into Wisconsin. Very large deposits

netic ore have been found south and west of the lake in question, some of which are known to be as pure as the red oxydes of the Jackson and Superior.

There are five varieties of iron ore. The most valuable, so far as developed, is the specular hematite, which is a very pure anhydrous sesqui-oxyde, giving a red powder, and yielding in the blast furnace from sixty to seventy per cent. of metallic iron, which is slightly red short. The ore occurs both slaty and granular and massive. It is often banded or interlaminated with a bright red quartz or jasper, and is then called "mixed ore." The next in order of importance is probably the soft hematite, which much resembles the brown hematite (Limonite) of Pennsylvania and Connecticut. This ore is generally found associated with the harder ores, from which many suppose it is formed by partial decomposition or disintegration. It contains some water, chemically combined, is porous in structure, yields about fifty-five per cent. in the furnace, and is more easily reduced than any other ore of the district. It forms an excellent mixture with the speculars. The magnetic ore of the district has thus far only been found to the west of the other ores, where none of the other varieties have been found except the specular, into which the magnetic sometimes passes, the powder being from black to purple, then red. It is not improbable that they may be varieties of the same ore, as they are very much alike in richness, nature of iron, and geological structure.

The flag ore is a slaty or schistose silicious hematite, containing rather less metallic iron, and of more difficult reduction than either of the varieties above named. It is often magnetic, and sometimes banded with a dull red or white quartz. The iron is cold short, which is one of the best qualities of this ore; the other ore of the district being red short. This ore varies much in richness, and comparatively little has been shipped. It is, however, probably the most abundant ore in the district. A silicious iron ore, containing a variable amount of oxyde of manganese, is found at several points accompanying the flag ore. This ore is unquestionably of great value as a mixture, but as it has but just been introduced, its importance cannot yet be determined. There are twenty-four mines at present opened and in operation.

The Indians knew of the existence of iron in this district for many years previous to its discovery by the whites, but were, of course, ignorant of its uses, or, at least, of the means by which it could be made available. They knew also of the existence of lead in large quantities, and Mr. BARBEAU informs us that in 1830 he met Indians who had collected lead sufficiently pure to be used for rifle balls, and they did so use it. But they could never be persuaded to tell where they found it, and to this day refuse to give any information whatever concerning it. They appear to entertain a superstitious fear that some dreadful calamity will befall them should they discover their secret to the white man. Mr. BARBEAU says that in 1845 ACHILLE CADOTTE, a French and Indian half-breed, was informed by an old Indian chief, then living at the mouth of Carp river, near the site of the present village of Marquette, that he knew where there were mountains of iron, and went with the chief to see them. The name of the chief was "Man-je-ki-jik" (Moving Day), and his brother, "Man-gon-see" (Small Loon), is still living. CADOTTE then communicated his discovery to Mr. JOHN WESTERN, who went with him to the mountain, and, under his direction, nearly a ton of ore was packed from what is now known as the Jackson location, to the mouth of the Carp, thence in canoes to Sault Ste. Marie, and thence to Detroit. It is more than probable, however, that it was P. M. EVERETT, Esq., of this place, to whom Mr. BARBEAU refers, since it appears that JOHN WESTERN did not visit this region in 1845, and Mr. EVERETT did. In June, 1845, the Jackson Company was organized with a view to operations in the copper district, and Mr. P. EVERETT, one of the original incorporators, came to Lake Superior the same summer, and located what is now the Jackson mine, under a permit from the Secretary of War.

It must not be inferred from the statement of the number of mines actually opened and now being worked, that they constitute the extent of our iron deposits. The mountain to which "Man-je-ki-jik" conducted Mr. EVERETT, and from which all the Jackson shipments have been taken, is within the corporate limits of the village of Negaunee, only a dozen miles from the lake shore. Since EVERETT first brought it to the notice of the original corporators of the Jackson company, by whom it is still owned, developments have gradually extended westward, until we have had to record the newest and most promising openings at and around Lake Michigammi, about twenty miles west of Negaunee. And still the iron interest of the upper peninsula is in its infancy; for though the shipments embrace in the aggregate several million tons, scarcely a perceptible mark has been made on the vast and inexhaustible deposits which are known to exist, many of them still untouched, and far removed from the scene of active operations. On all sides of Lake Michigammi—north, south and west—and on the Menominee, southward, immense deposits have been discovered, compared to which the famous "Iron Mountain" of Missouri sinks into insignificance. Nor is iron the only mineral which is known to exist in that portion of the upper peninsula known as the iron region. Copper and silver lead have been discovered, and we believe that developments yet to be made will shortly prove that they exist in paying quantities. On the Menominee has been discovered an immense marble quarry, and in other localities slate suitable for roofing purposes. In many portions the soil is well adapted to agriculture, and experiment has demonstrated the fact that wheat, oats, barley, and even fruit, can be grown to perfection. With its immense mineral resources, its boundless forests of pine and hard wood, a fertile soil and healthful climate, it certainly possesses all the natural advantages requisite to the growth of a great and powerful State.

MINING SUMMARY.

California.

The *Stars and Stripes* of the 4th inst. says, in regard to the same mine: We have recently chronicled a number of extraordinary quartz specimens from the mine of WILLIAM GREENE, between this place and Ophir. During the past week we have inspected still other specimens of free gold of very peculiar formation and appearance. One piece was a plate of gold, thin, broad, smooth and shining, resembling a doubled-up plate from a dentist's laboratory. Another was gold of a similar appearance, only that it had apparently been roasted and reduced to a molten mass. But for the character and standing of the gentleman who had taken them out, and who had possession of them—Mr. GREENE himself—we should have suspected the genuiness of these as productions of nature, if we had not also, and in the same connection, examined a piece of quartz with a similar plate of gold running through and protruding for an inch or more beyond one of the outer edges of the rock. Last Sunday a Chinaman brought in and sold to HUBBARD & ANDREWS a small slug of solid gold, about an inch wide, an inch and a half long, somewhat thicker than a $20 piece, weighing about $23, which bore evidence on both ends that it had been chiseled or chopped with a dull instrument from a solid mass of the same material. For about eighteen months different Chinamen have at irregular intervals brought in and sold to the same firm blocks of gold, bearing similar marks, weighing $40, $50, $100, and as high as $200 each. Where they come from is a mystery, but there seems to be pretty fair grounds for believing that somewhere in this vicinity our Celestial friends have found a gold deposit such as most old miners have dreamed of, but which few have seen Last Monday morning HUBBARD & ANDREWS shipped from this place to San Francisco about thirty thousand dollars' worth of gold dust. Their Monday shipments have for some time averaged twenty thousand dollars and upwards.

NEVADA COUNTY.

The dividend of the North Star Mining Company, says the *Bulletin*, is $4 per share for the current month, not $3, as misprinted. This company has paid regular monthly dividends since November, 1870, when $1 50 per share was disbursed, followed by $2 in December, and then by $3 per share for January, February, March and April. The run during the past month has been the best in a long time, and hence the increased dividend. Some very rich specimens were recently taken from the 1,200-foot level, which can now be seen at the office. The stockholders are much pleased at the present flattering condition of the mine. As there are but 3,000 shares of stock, the current dividend will be $12,000. It is expected that the amount will soon be increased to $5 per month. The stock is not on the list, nor do we know of any offering. We are informed that $100 has been recently bid for it, with offers to sell at $125.

SALE OF MINES.

The *Transcript*, of a late date, says: W. L. TISDALE, of this city, has sold his entire interest, thirteen twenty-fourths of the Star Spangled Banner mine, to the company. The mill, which has been shut down during the past week, will, we understand, be started up immediately for regular work. We understand that the sale of the Marietta mine, in Washington township, is about concluded, and that the amount to be paid is $200,000. This mine has been yielding very large returns, and is one of the best in the county. Outside capital is eagerly seeking investment in this county, and we hear that several other important sales are on the tapis.

EAST EUREKA MINING COMPANY.

We have noted, heretofore, says the Grass Valley *Union*, that the East Eureka Mining Company, a London incorporation, now owns the mine which was known as the O'CONNOR mine, located about two and a half miles east from Grass Valley, and doubtless on the same ledge as the celebrated Eureka and Idaho mines. The mine was also owned for a time by the Grass Valley Consolidated Company. The East Eureka Company, now owning and working the mine, has not entirely completed its organization, but has done enough in that way to commence work in earnest. We visited the East Eureka mine lately, and were astonished as well as delighted at the work now being done, as well as at the evidences of the future prosperity of the mine. As very few of our Grass Valley readers even are aware of the situation of affairs at the East Eureka, we give a slight and imperfect sketch of the works. There is a hoisting and pumping engine at the shaft, and this is now running to keep the water out of the mine, and to hoist ore. The mining underground is being pushed with energy, and good rock is being taken out. We examined a number of pieces which showed free gold. The ledge is about two and a-half feet long, and is growing stronger as it goes down. The new mill, which is being erected by Mr. O. CRANDALL, of San Francisco, who has the contract for the entire work, is just now the feature of the mine. This new mill is to have twenty stamps, and the machinery and battery are to be of the best and most substantial description. The mill building is to be commodious and roomy enough for all purposes connected with the business, but will not be as expensive as is too often the case with mill buildings. The building, including the shed over the ore-platform and the engine-room, will be 120 by 67 feet in size. The engine-room of this mill will be 40 by 23 feet. The stamps are to weigh 860 pounds each, and will drop 80 times a minute. The stamps will be driven by an engine of 14-inch cylinder and 30-inch stroke, the steam being supplied by a boiler 16 feet long and 45 inches in diameter. The cams and tappets are of extra size, as all of the castings are, new patterns having been made for all of the castings. The rock-breaker is of Wheeler's patent, and will be capable of putting through 100 tons of rock every 24 hours. In addition to the engine which will drive the stamps and the pans, there will also be a new pumping engine at the shaft. The engine now in use, which is a good one, will be good for the hoisting. The battery is on a new plan, and is certainly the best one yet invented. Mr. A. J. RIGBY is the originator of the plan for the foundation of the battery, and Mr. CRANDALL, who has built many miles on this coast, and who is familiar with the plans of almost all the mills erected, informs us that Mr. RIGBY's invention in the way of a foundation for the battery is the best he has seen or of which he has heard. To get a solid foundation an excavation was made to the depth of 15 feet from the leveled surface of the ground. The pit is four feet wide and 27 feet long. The bottom of the pit is of rock. In this bottom is laid a concrete foundation, composed of cement, sand and lime. This was put in and tamped with hot irons, which makes it smooth on the top, and harder than the rock beneath it. On this concrete bed a set of timbers, dressed to a guage and joined as perfectly as possible, is laid. These timbers are 18 inches thick and four feet long, covering the 27 feet of concrete completely and nicely. At right angles to these first are a second set of timbers, also perfectly joined, of the same thickness, and 27 feet long. Upon these sets of crossed timbers the mortar timbers are to rest. The mortar timbers rest vertically, or stand up on the foundation. The mortar timbers are 30 inches square and 14 feet long. It will be seen that the stamps of the mill will have solidity below them. The frame work which supports the cam-shaft, and the guides for the stamps, is founded also upon the concrete, but does not touch the crossed timbers on which the mortar blocks rest. The jar of the cam-shaft will not, therefore, unite with the concussion of the stamps to weaken the foundation. The frame work is composed of timbers 20 inches by 24 inches in size, and these are "gained" and bolted together in the most complete manner. The plans and specifications of the mill building, battery and machinery were drawn by Mr. A. J. RIGBY, of this place. The castings have been made in San Francisco, and are the heaviest ever made in that place, for mill purposes. The new mill will be ready for work by about the first of July, at which time there will be a large quantity of rock on hand and ready for the battery. The rock on the dump shows well and is estimated to be worth, at the lowest, $20 per ton, by mill process.

SIERRA COUNTY—BIG PAN CUT.

The Downieville *Democrat*, of May 4th, is elated about the success of the Keystone mill, twelve stamps, which, after a run of thirty days, cleaned up over $22,000.

The *Messenger*, May 6th, says: P. GRANT, owner of the Leonard quartz mine and mill, has gone to work to make the thing pay. He is now crushing rock. It is estimated that the North American gravel claims at Whiskey Diggings will take out $50,000 this season. The Shamrock gravel claim, at Fir Cap, paid 280 ounces in the last four weeks, working night and day with five picks to a shift. BORDWELL & COOLEY started a tunnel in the first ravine east of La Porte, nine years ago, and were laughed at. A few days since rich gravel was struck at the end of a tunnel 1,700 feet long. The larger portion of this ridge is in Sierra.

Colorado.

The *Transcript*, Golden, Col., May 10th, says: We were favored yesterday with samples of very rich ore from the Queen lode, situated some three hundred miles south of the Seaton. It is owned by J. F. HALL, Mr. BANTA, Mr. QUEEN and Mr. MORGAN. It has a crevice fourteen inches wide, for which, unassorted ore, Prof. HILL pays one hundred and fifty dollars per ton. The first-class ore assays about four hundred dollars. The lode is now opened every forty feet for fifteen hundred feet, showing good ore all the way. At a cost of about three hundred dollars the owners last week took out ore which they sold for eleven hundred dollars. This lode, though a recent discovery, is evidently one of the best yet discovered in Colorado. The ore is mainly zinc blende, containing a trace of copper and a large amount of sulphuret of silver. A sample in our possession shows a large amount of pure silver. This mine must become one of the great bullion producers at a very early day. The following is the gold shipment of the three banks for the month of April:

	CURRENCY.	COIN.
Thatcher Standley & Co.	$55,000	$50,000
Jerome B. Chaffee & Co.	24,000	21,750
Rocky Mountain National	24,000	20,800
Total	$103,000	$92,550

This compares as follows with the April shipment of the last three years (coin):

'68.	'69.	'70.	'71.
$79,000	$108,000	$78,000	$92,000

And below is the total shipment so far for this year—Jan. 1 to April 30—(coin):

January	$74,200
February	120,000
March	91,500
April	92,500
Total	$378,200

To this is to be added the shipments in matte from the smelting works, which forms a very considerable portion of the bullion export. The first four months of the year are always the poorest. It is pretty clear that our shipments from Gilpin county this year will all little, if any, short of two millions. The *Miner* says: Our friend, E. S. STREETER, is engaged in opening the College lode, on Sherman mountain. He informs us that the crevice is about four feet in width, the pay streak varying from one to six inches in width. The ore found is sulphuret, and is of most excellent quality, specimens assaying as high as 1,016 oz., $1,300‡, coin, per ton. Work on the E Pluribus Unum lode, Sherman mountain, is being actively prosecuted. The mine is presenting a good appearance, and can be relied upon to furnish a good quantity of rich ore. OUSLY & Co. are working on No. 2, east on the O. K. lode. They are running adrift from the end of the tunnel that cut No. 1, east on the lode. We learn that they have a good vein of pay ore, consisting of about two and a half inches of solid mineral. The Briggs lode, Republican mountain, is being opened by CHARLES KIMBERLAIN. The shaft is now about twenty feet deep, and a tunnel will shortly be commenced to more thoroughly open the vein. The Stewart Silver Reducing Company has shipped during the last six days $6,921,62 in silver bullion, coin value. Two months will probably elapse before the Arey furnace can be put in operation, at which time the miners are promised a reduced rate for treatment, as well as a higher purchasing schedule. From all that we can learn on the subject, it looks as if active milling operations would be resumed in the Empire during the coming summer. The Palmer & Nickols Reduction Works are in full blast, the water in the creek being sufficient to furnish power. The new amalgamating machine will soon be in running order, and will materially increase the capacity of the mill. The firm are buying considerable quantities of rich ore. One lot of 2,711 lbs. of ore from the Alabama lode, Leavenworth mountain, netting to the miners, Messrs. PERTLE & WILLIAMS, the snug little sum of $635,56. The bullion shipment for the past week amounts to 5,431,75 ounces, coin value, $5,809,65.

A correspondent of the Denver *Tribune* writes the following from Fairplay: The mines of Park county are perhaps less known than those of any other county in the Territory, yet they are second to none; and it is usually the verdict of Eastern men and others who come here that our mines, and the facilities for working them, are superior to any others. We have an abundance of good wood right at the mines that it will take years to exhaust; a good coal mine has been developed at Mr. LECHNER'S ranch, fifteen miles, from Buckskin, and we have hay enough within twenty miles to supply the Territory. At Mosquito District, situated seven miles west of Fairplay, Messrs. MOYANHAN & HOSTETTLER have been at work on the War-Eagle lode for the past year. Their crevis is eight feet wide, filled with ore that assays $436 per ton. Last season they ran their ore in arrastras, and it yielded at the rate

seven dollars per foot, or about ninety dollars per ton. Messrs. M. & H. do not profess to save more than seventy per cent. of the gold, losing all the silver and copper, the two amounting to about $200 per ton. So you can see that the loss at this one mine alone is no small item. They have about two hundred tons on their dump, and it is safe to say that there is no lode in Colorado that can produce any better ore than the War-Eagle. Near the War-Eagle is the Orphan Boy, owned by the South Park Gold and Silver Mining Company of Philadelphia, and J. W. SMITH of Denver. This is one of the best mines in Park county, having run as high as $1,380 per cord in ordinary stamp mills. The S. P. Co. have a shaft 104 feet deep, and at that depth they have a crevice ten feet wide, with about eight feet of ore. The ore looks as well as the best ever taken out of the lode, and why the company is not at work is a problem that cannot be solved by those who know the mine. Mr. SMITH has about 150 tons of ore on his dump, which is about the same nature as that in the War-Eagle. Near the Orphan Boy is the Kitty Clyde Sterling, Evening Star, Elephant and the De Mary, all well-developed lodes, and would, if worked, produce a large amount of ore. There are a number of other lodes that look well, and would be paying mines, if properly worked.

The Georgetown *Miner* has the following mining items: Work on the Hiawatha tunnel, in Hiawatha mountain, is being pushed ahead with all possible vigor. The Stewart Silver Reducing Company have shipped since our last issue, silver bullion to the amount of $6,487 86, coin. On Friday last the Brown Silver Mining Company shipped a "button" of silver bullion weighing 387 lbs., Troy, and valued at $6,000, currency. We learn that the Arrastra mill, on Spanish Bar, near the Whale mill, now being run by Mr. BAKER, is treating gold ores with success. The ore furnished to the mill is mainly from the Schaffter lode, and its yield is very satisfactory. The Laura Dale lode, on Republican Mountain, is now being actively worked by Mr. MCAFEE. The lode is looking well, and is furnishing some very rich ore. We were shown a specimen last week that essayed 936 ozs. in silver per ton. We learn that work has been commenced on a portion of the Seaton lode, Idaho. The Seaton is a fine vein, and one that added considerable to the ore shipments from the county last year. The ore is taken to Hills' works, at Black Hawk. Idaho is sadly in want of a good reduction works. We learn that the Bismarck lode, Sherman Mountain, now shows twenty-two inches of solid mineral, consisting of solid galena, zinc blende and sulphurets. The ore is of good quality. The lode is being worked by Messrs. COX & COOK, who will soon be sending ore to the mill for treatment. Mr. RAE, who is running a mill on gold ores in the vicinity of Fall River, called on us on Saturday last. The Dr. informed us that he had just bought 600 feet on the Schaffter lode, Spanish Bar district, and that he had paid the sum of $1,200 for the property. We hope that the Dr. will vigorously work the mine, as there is no doubt but that it is good property. The Stewart Silver Reducing Company have purchased a number of lots of rich ore during the past week, including two lots from the Equator slide, one of which assayed at the rate of $757, and the other at the rate of $610 95 per ton. They also purchased three small lots from the Guthrie, all of which were rich. During the week past, some ore from the Nuckolls, weighing 656 lbs., and assaying $221 per ton, was sold to the above company, for $516 65, currency, also a lot of ore from the Alabama lode, Leavenworth mountain. This last lot weighed 745 lbs., and netted $216 78, assaying at the rate of $711 per ton.

The Palmer & Nichols Reduction Works have purchased a large amount of ore during the past week. Among other lots we noticed 1,500 pounds of float ore, that assayed 258 ozs., and 636 pounds of the same that assayed 557 ozs., all from Leavenworth mountain; also a lot of Compass & Square ore, 871 pounds in all, which assayed 384 ozs.; also 5,561 pounds from the Magnet lode, assaying 152 ozs.; also 1,161 pounds from the Guthrie lode, assaying 274 ozs.; also 3,467 pounds of second-class Killiwinning ore, that assayed 94 ozs.; also several tons from the Cyrstal lode, in the eastern end of the county, and carrying some gold. The bullion shipments of the firm during the past week amount to $5,299 48 coin. The bars are as follows: one bar 1,120.6ozs., ·723 fine, coin value $1,048 47; one bar 155.2 ozs., ·592 fine in silver, and ·014 fine in gold, coin value $163 68; one bar 512.5 ozs., ·809 fine, coin value $536 07; one bar 1,074 ozs., ·762 fine, coin value $1,058 10; one bar 433.75 ozs., ·656 fine, coin value $367 90; one bar 526.45 ozs., ·900 fine, coin value $612 58; and one bar 1,300 oxs., ·900 fine, coin value $1,512 68.

Montana.

MADISON COUNTY.

The *Montanian*, May 4th, has the following mining intelligence: The flumes in the central and lower portion of Alder gulch are now all working. Just opposite the foot of Wallace street there is a large number of men stripping ground that is thought to be very rich, and on the hill above there is a Chinaman to about every five feet of ground, whose rockers are kept steadily going, we understand, with good returns. There are about as many Chinamen as white men now working on the bars and in the gulch, and some of them are making clean-ups that remind one of the palmy days of '63. The amount of gold sold to our bankers is increasing every day, and the shipments East are heavier than they were at corresponding dates last year. The snow at Summit is still deep; therefore up to this time there has been very little done in the gulch. A number of our flume owners have let their ground to Chinamen on the shares, which is very favorable to the owners, but of great detriment to the working white men and producing class of our people; though, notwithstanding the large influx of Chinamen to our diggings this spring, white labor is very scarce, and commands good wages. If reports from Summit, in regard to the improvement of the different ledges there being worked, be true, in two months every day-laborer in the gulch could be worked profitably on the lodes. Even one good paying lode, if worked to its fullest extent, will employ a large number of hands.

SUMMIT.

The quartz in How's tunnel, on the Oro Cache is still improving in width and richness. The lower tunnel in the same lode, being worked by P. A. LARGEY, is doing much better. Considerable quartz is visible in the fan. Mr. LARGEY is certain of success. Col. POSTLEWAITE'S works on the Keystone are turning out a considerable amount of rich rock daily, and looking more encouraging after each day's work.

HOT SPRINGS.

Our enterprising townsman, F. R. MERK, is meeting with fine success in his mining operations at Hot Springs, and the indications are he will succeed in this district, where heretofore failure seemed inevitable, and the miner's arch enemy, PETER, was monarch of the situation. We wish friend MERK exuberant success, and feel confident he will be richly rewarded for his perseverance and large expenditure of money—if he only has the sand—but it requires an extraordinary amount of that commodity to buck against Hot Springs quartz and cap rocks. We have tried it ourself and know it's "the worst we ever saw."

BROWN'S GULCH.

A number of arrastras are being built on BROWN'S gulch, and the ledges that are being worked look remarkably well. The only drawback to this district is the difficulty in saving the silver from the ores, though it is hoped and expected that during the coming summer the quartz men of this locality will discover, by their numerous experiments, a process by which they will be able to master the refractory metals, and cause the Pacific, Black and other ledges of this district to take their rightful places alongside of the Comstock, Emma and other mines of like calibre. You may laugh, but there have stranger things than that happened, friend CHUNKY.

SILVER STAR.

Messrs. AINSLIE & TRIPP'S mill, we are told, is running at Silver Star. Mr. HARPER has the mill he lately purchased from Jackson at the place for erection, and will proceed with the same immediately. Mr. PORTER reports the Clipper lode looking better than ever, and yielding a larger amount of ore, considering the richness of the same. A number of other ledges in the district are being worked with light forces and good results.

BEAVER HEAD—ARGENTA AND BANNACK.

Reports from these camps are very favorable. The smelting works of Argenta are yielding well, and old Grasshopper, with her bar and sags, will disgorge more of that article which maketh the heart glad this season than she has for years. The quartz interests of Bannack are also looking up.

LEWIS-CLARKE—JEFFERSON CITY.

The new smelting works at Jefferson City last week completed the first run of forty tons of ore, which produced sixteen tons of metal. This metal assays as follows:

Per ton, 237.35 oz. silver	$307 80
" oz. gold	502 32
Total precious metal	$810 12

It is thought by the owners that the expense of shipping to the States and separating will be covered by the value of base metals contained in the bullion. For four years the proprietors of the different silver mines in the vicinity of Jefferson City have worked hard and patiently, and it would now seem that perseverance is about to meet with a rich reward. None are more deserving—*Herald.*

GOLD BUTTON.

The Cameron Company, at Cable City, cleaned up last week 247 ounces of fine retort, worth about $3,700. This was from sixty tons of rock, which is the largest run ever made from the same amount of ore. The mine is now looking finely and promises to produce a very superior quality of quartz. The main shaft is now down to a depth of 182 feet.—*Independent.*

DEER LODGE—BLACKFOOT.

Mr. JOHN G. MCLEAN, down from Blackfoot, gives us a few items from Ophir. There are but few companies at work yet. The cold snap froze the waters in the head of the ditches, and a large force is now engaged cleaning out the ice. If the weather holds fair, water will be down by next Monday. A company have been running a cut from Ophir right up into Blackfoot, starting in the bank below SMITH'S, and heading for the vacant lots, where the fire destroyed the buildings in 1869. They made a run last week, and cleaned up, Saturday, $4 per day to the hand. This week they expect it will average $8. Good bye, Blackfoot City. A great many men are coming back, and those in town are moving out on their claims, preparing for a big summer's work. The bar at Warm Springs, five miles down the gulch, is attracting considerable attention. There is fully 100 acres in the bar, and it prospects well. GEORGE BERNARD & Co. are bringing in a ditch five miles long from Snow Shoe to cover the bar. Some ten or fifteen men are at work, and it is nearly completed. WILLIAM WOODS has started a boarding house at the bar, and it is anticipated there will be a lively, good-paying camp developed. On the whole, Blackfoot and the suburbs are good for as much gold as any previous year, and it is one of the best camps, run by as good men as any in Montana.—*New North-West.*

MISSOULA.

From Quartz Gulch we are informed that good prospects have been obtained on No. 17, below discovery, in the upper district. About 20, below, favorable prospects in the drain have been got; No. 12, below, also, it is thought, will pay well. On Long Bar, in the lower discovery, No. 40 is expected to yield big money. In this latter claim $32 was taken out with a rocker by one man in five days, and as high as $3 50 was taken out of No. 20, above, in the upper district. In No. 40, above, the claim owners get good average prospects. A number of drains are being run, some of which are on bed-rock. Sluicing will commence in earnest in a few days, so that it will take only a few weeks' washing to determine whether Quartz Creek will yield gold in sufficient quantities to remunerate the miners.—*Pioneer.*

Nevada.

ACCIDENTS.

From the Gold Hill *News* we learn that on the 28th of April JERRY MERVEY, a miner employed at the Lady Bryan mine, was badly injured by the fall of a large quantity of rock from the face of a large cut made in the croppings of the lead. His left collar-bone was broken. The cap of one of the bones of the right ankle was split off, and one of the bones of the right leg broken near the ankle. He was also considerably cut and lacerated about the small of the back and side. The same day, HENRY HOLMAN, working in the Crown Point mine, was knocked senseless, and cut and bruised considerably about the shoulders, back and breast, by a mass of loose rock falling upon him.

JOHN GILL, says the Gold Hill *News* of May 8th, was accidentally killed in the Yellow Jacket south shaft, at about three o'clock this afternoon. He was on the cage, near the 900-foot station, when a heavy block of wood accidently fell out of the pump compartment of the shaft, from the 300-foot level, falling 600 feet, crashing through the stout iron roof of the cage and striking the unfortunate man with such force as to break his back. He was brought out as soon as possible, and surgical assistance sent for, but he lived only a few minutes, dying soon after being taken to his cabin, near by. Mr. GILL had charge of the pumps of the mine, keeping them in order. He was a very excellent, trustworthy man, and had been in the employ of the Yellow Jacket Company for some years past. He was about thirty-five or forty years of age, and a native of England, where he leaves a family of four children.

ROCKY MOUNTAIN COAL FOR MILLS.

The Territorial *Enterprise*, under this heading, has this: The Rocky Mountain coal is to be soon tested in our mills. A lot of fifty tons arrived yesterday for PARKE & BOWIE'S mill, on Six-mile Cañon, and some of the mills at Gold Hill have made arrangements to use it. As it is found to answer well on the Central Pacific Railroad, where it is in constant use, we see no reason why it should not give equal satisfaction when used under the boilers of our mills and hoisting works. BREED & CROSBY, agents of the Rocky Mountain Coal Company, have had a number of huge wagons constructed, to be used in freighting the coal from Reno to this city. Three of their fourteen-horse teams arrived yesterday, each drawing two large wagons, the combined weight of which is 11,000 pounds when empty. They carry 40,000 pounds of coal, making the total weight hauled by each team 51,000 pounds. Soon a large number of these huge wagons will be put upon the road. In the present condition of the roads, a team of fourteen horses can haul all the coal that can be piled upon the largest wagons—bringing one wagon at a time up from the foot of the Geiger grade, of course. The tolls on each pair of wagons between this city and Reno amount to just $14 60, which must be paid by the consumers of coal in this city and vicinity, yet the coal is found to be cheaper than wood. The coal is furnished mill and mining companies at $20 per ton, in bulk.

ELY DISTRICT.

The *Record*, April 23d, says: WELLS, FARGO & Co. shipped yesterday, by the way of Salt Lake, eleven bars valued at $12,554 37. The same paper, of the 27th, says: W. F. & Co. shipped yesterday, by way of Salt Lake, five bars of bullion for the M. V. Co., valued at $6,600 88; for BARNUM W. FIELD, bullion valued $5,167 61.

MEADOW VALLEY COMPANY.

Wagons can now be loaded with the greatest facility at nearly all the mines of the company; all are accessible to teams by roads of easy grade. Three new boilers, fifty-six inches in diameter, sixteen feet long, of forty-two three half-inch tubes each, have just arrived, and two are being placed in position. The other is held in reserve against emergency. The company are taking down their old smelting furnace, erected two years since. The brick are to be used in the mill at the Valley. The Chicago mill will start up on Friday—having been leased by HANCHET and others. The erection of a Stetefeldt furnace will be commenced immediately.

EUREKA DISTRICT.—EUREKA CONSOLIDATED COMPANY.

The *Sentinel* of April 29th says: The Company's mines look as well as ever. There are two ten-horse teams hauling from the mines, on Ruby Hill, two miles from the furnaces. They make each two trips daily, hauling at each load 28,000lbs. of ore per team, making a total of 56 tons. After the first of May, when the new furnaces will be running, two more teams will be put on the road, and then there will be hauled daily not less than 112 tons of ore. The Wellington mine on Adams' Hill, north of the Phœnix Co.'s Lexington and Empire, is opening up handsomely. The shaft, though but eight feet deep, and eight feet square, shows ore on every side. The Nourmahal mine on Adams' Hill, next east from the General Lee, promises well, assaying as high as $282.

ROSLIN COMPANY.

For months this furnace has been turning out bullion on an average of four tons per day, which is worth, in silver and gold, $350 per ton. There is now at the furnace sixty tons of this bullion awaiting shipment to Selby & Co., at San Francisco. The mines from which the ore has been obtained, are the Elise, Hamburg, Helen Mortimer, Diligence, and Sterling. Assays have been made from the Eclipse of $10,270 per ton, and the average of hundreds of tons has been $270. The average width of the ore is eight feet, and this is at a depth of 102 feet. A tunnel is now in 110 feet on the Sterling and Diligence. This company also has a 200 foot tunnel in the Helen Mortimer hill, and are now running on a ledge three feet wide. Every mine of the company is producing good ore, and will yield more than half a dozen such furnaces can smelt.

ESMERALDA—WALKER RIVER.

The *Enterprise* of April 27th says that Messrs. Kennedy and Hurd have discovered an immense ledge thirty miles west of Walker Lake, and sixty-five miles from Virginia City. The ledge is forty feet wide, and has been traced three thousand feet. The proprietors sunk a twenty-foot shaft, and run a cross-cut, the ore from which assays from $50 to $1,900 per ton. They have named the lead the "Grutli."

Utah.

A new mining district has been organized in Cache county. It is called "The Oxford Mining District," and is located in the range of mountains that lie between Malad Valley and Cache Valley, commencing at a point a little south-east of Clifton cañon, at the White Sandstone Quarry, from thence to the mouth of the Clifton cañon, thence up centre of said cañon (main fork) to its head, thence west to the top of the mountain, thence west to two miles, thence in a northerly direction along said mountain twelve miles, thence east six miles, thence south to the place of beginning. Mr. A. COOPER of Oxford is the recorder. The ore of the district found so far is argentiferous galena. Specimens from the "North Star," the first ore discovered, assay $7,500 per ton in silver.

DIAMOND CITY.

Prospecting and building are the rage just now. Lots are in demand and selling at prices ranging from $25 to $100. Mr. HAMMER brings some fine ore from Shoebridge, Estella and Susan mines, which assays from $100 to $500. The Shoebridge shows a fine body of ore. There are about twenty new buildings in course of erection in Diamond City. The Venture is a new location, and bids fair to rival every other mine in the district. It is milling ore. Messrs. CHAMBERS, JEFFRIES and ARMSTRONG, of Council Bluffs, Iowa, are on a tour of inspection to the mines, and think of locating in Tintic. Jones' furnace will start within ten days. CHARLEY CHRISMAN is still "monarch of all he surveys" on Eureka Hill. Mr. JEFFRIES is trying to secure a private privilege, erect a forty-stamp mill and a Stetefeldt furnace. N. P. LAKE has plenty of ore on the dumps of the Sunbeam, Dagon and Great Eastern.

CENTRAL CITY.

A correspondent from Central City writes that a first-class vein of ore was struck last week by JOHN BURKE on the Good-speed trail, two and a half feet thick. Seven assays have been made of the ore; the lowest was $2,200 and a fraction, and the highest a trifle over $3,500. All the mines that are being worked are improving, without an exception. The weather is mild and pleasant, snow settling very fast, and business looking up. Lively times are in store for us. JONES & PARDEE'S furnaces will start in a few days, and we hear from a reliable source of two other furnaces about to be erected in the cañon.

MARKET REVIEW.

The Coal Trade.

NEW YORK, May 26, 1871.

The Coal Trade is itself again. All the anthracite regions, except the Lehigh, are harmoniously at work. The difficulty yet existing there results from an endeavor by the miners to coerce the operators into adopting the basis of '69, which is about ten per cent. higher than the rates at which the other regions have resumed labor. As we intimated in our last, there will be a stubborn fight. It is much to be deplored, since Lehigh coal answers a certain purpose in manufacturing, for which no other coal can be substituted, except at a loss to the manufacturer. The miners by this obstinacy, are stirring up in the community a feeling which in future troubles will tell heavily against them. We have certainly not been wanting in sympathy for them; but we cannot follow them to every length of unreasonable action; and we feel that it is now capital, rather than labor, which needs protection.

The ninetieth (?) regular auction sale of Scranton coal, and the first since the suspension came to a close, is announced in our advertising columns this week. The sale will take place on Wednesday next, May 31st, at the usual time and place, and 80,000 tons of the usual sizes are offered. There is much speculation in the market as to the prices that will be realized; but it is generally believed that they will about average the Pittston prices to contractors, which we note below. The market is quite weak to-day; but not more so than is usual three or four days preceding a great sale. We would like to see the *lowest prices* of the season mark this sale, in order that we may have a steady trade henceforth and rid the market of all speculative temper. With the immense facilities at our command for producing coal, and the renewed efforts of all operators who have been idle for six months past, we must expect an enormous influx of coal. High rates cannot be maintained; and unless we start with low prices there will be such a feeling of uncertainty that trade will become demoralized and a stagnation will supervene, until such prices are established as will warrant purchasers in taking coal freely.

The Pensylvania Coal Company issued their circular to contractors, for the month of June, in the early part of the week, presenting the following rates: Lump and Steamer, $5 50; Grate, $5 70; Egg, $5 80; Stove, $6 00; Chestnut, $5 30, deliverable at Newburgh on the Hudson, freight to New York about 70 cents. If there is any coal mined out side of what the contractors take, it will be offered to the general trade, at an advance of from 20 to 25 cents.

The Delaware and Hudson Canal Company have issued a similar circular, at about the same figures: their coal is delivered at Rondout. They have as yet received but little if any coal; but expect to be able to ship next week.

In consequence of the dullness in trade there will be no change in our quotations of prices until next week. The prices obtained at the sale will be taken as a standard and basis for other coals in proportion to their relative value.

Cumberland coal is in steady demand at $6 50 in schooners, and $7 alongside in barges. There is a reported break in the Chespeake and Ohio Canal, which, if extensive, may materially interfere with shipments. The low prices at which anthracite coal is selling, makes close competition for the Cumberland coal, but we are pleased to say that so far the market has been very little affected by it. The retail trade in anthracite coal has been startled by a circular of the Pennsylvania company at the following rates: Grate and Egg, $6 25; Stove, $6 75; Chestnut, $5 75 *in yard*. The charges for delivery have heretofore been included in the price of the coal. Thus the party living ten doors from the yard, paid as much for coal as one living twenty blocks away. This the company considers unfair, and will hereafter charge in proportion to the distance the coal is to be sent. We think this is a move in the right direction. This plan has been in vogue for factories for years back; but we believe this is the first instance where it has been introduced for private individuals.

FREIGHTS.—Vessels become scarce as business revives, but rates are unchanged.

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending May 20, 1871.—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871.. tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	42540 00	28835 02	229043 11	394082 17
Upper Lehigh Region		4175 05	4614 06	40512 05
Beaver Meadow Region		4543 05		16822 14
Hazleton Region	235 18	9265 06	2386 14	83709 06
Mahanoy Region			1043 03	
Tresckow Region			25552 08	30089 18
Mauch Chunk Region	2386 14			
Totals	45162 07	46519 01	260640 02	515217 06
Increase	1356 14		254576 18	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	40668 01	21915 07	226875 07	354386 10
Forwarded East of Mch Chunk by Canal	2728 19	17757 09	8795 02	65344 17
Delivered at and above Mauch Chunk	601 18	831 02	20380 15	14866 16
Delivered to L. & B. R. R. at Plymouth Bridge		5592 15		70216 06
L. V. R. R. at Packer'n	1163 08	422 08	4578 18	10312 11
Totals	45162 07	46519 01	260640 02	515217 00
{the above there was transported on acc'nt of L. C. & N. Co.	2386 14		24768 15	46743 15
W.-B. C. & I. Co.	37553 11	12537 07	197619 08	159484 08
Totals	39940 05	12537 07	222408 03	206228 03
Increase	27402 18		16180 00	
Decrease				

Lehigh Canal Coal Trade.

Shipped for the week ending May 19, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region,	4019 07	4300 01
" " Beaver Meadow "		778 12
" " Mahanoy "	282 01	740 00
" " Hazleton "	125 10	1246 00
" " Upper Lehigh "		
" " Wyoming "	2537 03	7266 16
Total	6964 01	14281 09
Corresponding week last year	17771 15	62366 13
Increase		
Decrease	10807 14	48085 09

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending May 20, 1871, compared with week ending May 21, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
Phila & Reading R. R	28,555	934 838	81,067	780,714
Schuylkill Canal	2,094	62,746	7,542	115,150
Lehigh Valley R. R.	66,171	1,246,642	18,530	490,072
Lehigh & Sus. R. R.	21,915	354,286	40,668	226,875
Lehigh Canal	17 772	62,367	6,964	14,281
Scranton North	13,864	241,472	....	....
" South	37,794	675,334	....	....
Penn. Coal Co., rail	24,349	408,044	....	3,566
" " " canal	329	8,214	....	236
Del. & Hud. Canal Co.	55,779	333,107	....	4,660
" East	5,204	170,629	....	52,560
" West	805	30,370	....	12,720
South	15,066	141,567	....	38,803
Shamokin	9,874	118,613	11,576	233,741
Trevorton	3,372	28,265	....	....
Lykens Valley Coal Co.	7,643	5,840	1,971	27,553
Wyoming South	11,724	39,497	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	5,494	115,364	433	35,901
Williamstown Co'y	6,740	102,635	....	....
Big Lick Col	2,289	11,977	2,932	42,996
Total	331,273	5,086,747	191,983	2,077,818
1870	191,983	2,077,818		
Decrease week and year	139,290	3,009,929		

*Less coal transported for Company's use and Bituminous coal

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, May 20, 1871:

From St. Clair	32,985 09
" Port Carbon	7,852 12
" Pottsville	1,420 13
" Schuylkill Haven	20,277 10
" Auburn	6,471 10
" Port Clinton	12,090 16
" Allentown and Alburtis	9 00
" Harrisburgh and Dauphin	20,520 09
Total paying freight	101,587 19
Coal for Company's use	3,050 00
Total for week	104,637 19
Previously this year	968,555 08
Total	1,073,193 07
To same time last year	1,234,594 19

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending May 20, 1871, compared with week ending May 21, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	19,758	293,988	29,693	432,213
C. & O. Canal	19,397	125,120	21,912	191,042
H. & B. T. R. R.	8 545	113,071	8,914	139,237
Harrisburg & D.	16,802	229,774	20,520	303,680
L. V. R. R.	....	5,156	14,400	37,725
P. & N.Y.C & R. Co.	....	84,220	5.900	112.445
{Cumberl'd Branch	2829	30,921	1,142	28.967
{" Canal.	3,670	26.502	5,914	57,145
Total	71,001	908,753	108,595	1302,454
			71,001	908.753
Increase.			37,394	393,701

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending May 20, 1871.

	ANTHRACITE Tons. Cwt.	BITUMINOUS. Tons. Cwt.
By Rail	433 10	5,900 00
Previously this year	35,467 11	106,544 18
Total by Rail	.....	.....
By Canal	.....	.....
Previously this year	.....	.....
Total by Canal	.....	.....
Total for the year	35.901 01	112,444 18
To the same time last year	115,364 11	84,220 00
Increase	79,463 10	28,224 18

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending May 20, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	8,120 02	85827 14
" Hazleton	571 02	222 186 07
" Upper Lehigh		442 06
" Beaver Meadow		75,377 06
" Mahanoy	13,124 04	179,568 19
" Mauch Chunk	38 07	2,290 18
Total Anthracite	22,353 15	565,693 10
Bituminous Coal from all sources	14,400 00	37,725 00
Total by rail and canal	36,753 15	603,418 10
Same time last year	86,632 18	1,449,908 10
Increase		
Decrease	49,879 03	846,490 00
Forwarded East from Mauch Chunk by rail	18,530 10	490,072 08
Same time last year	66,171 07	1,246,642 01
Increase		
Decrease	47,640 17	756,569 13

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	18,530 10	490,072 08
To N. C. R. R., at Mount Carmel	1,872 17	1,890 17
Forwarded North from L. & B. Junction	433 10	36,074 15
To L. & S. R. R. at Packerton for rail	111 16	2,757 06
Delivered at M'h Chunk	5 14	420 18
Delivered on line of road above Mauch Chunk	70 00	3,887 00
Delivered above Mauch Chunk for use of L. V. R. R.	921 17	19,193 19
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do. for canal	31 08	7,128 09
At M. Chunk for canal	376 03	4,173 08
Total Anthracite	22.353 15	565.693 10
Bituminous Coal	14,400 00	37,725 00
Total all kinds	36,753 15	603,418 10

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday May 20, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1871	21,912 16	29,693 17	51,606 15
1870	19,397 15	19.758 01	39.155 16
Increase.	2,515 01	9.935 16	12,450 17
Decrease			

YEAR.

1871	191,042 18	432 213 14	623,256 12
1870	125,120 00	293,988 05	419,108 05
Increase.	65,922 18	138,225 09	204,148 07
Decrease			

Cumberland Branch.

WEEK.

1871	5,914 18	1,142 00	7,056 18
1870	3,670 06	2,829 94	6,499 10
Increase.	2,244 12		557 08
Decrease		1687 04	

YEAR.

1871	57,145 17	28,967 06	86,113 03
1870	26,502 10	30,922 01	57,424 11
Increase.	30,643 07		28,688 12
Decrease		1,954 15	

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, May 20, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt
From St. Clair	32 985 09
" Port Carbon	7,852 12
" Pottsville	1,420 13
" Schuylkill Haven	20,277 10
" Pine Grove	5,096 17
" Tamaqua	12,020 16
" Harrisburg	26 00
" Dauphin	5,872 03
Total	85,582 00

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	9,941 11
" Mill Creek "	990 03
" Schuylkill Valley Scales	1,470 19
" Mt. Carbon "	1,367 19
" Cressona "	14,354 08
" Pine Grove "	
" Tamaqua "	1,190 06
Total	29,815 06

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	3,766 16
" Shamokin	3,734 10
" Herndon	
Total	7,501 06

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	715 12
" Lebanon & Pine Grove Branch	631 01
Total	1,346 13

CONSUMED ON LATERALS.

From Frackville Scales	728 04
" Mill Creek "	937 16
" Schuylkill Valley Scales	471 00
" Mt. Carbon "	342 07
" Cressona "	101 06
" Pine Grove "	26 12
" Tamaqua "	54 07
Total	2,011 12

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn's Br.	
" " Alburtis, " "	9 00
" " Oreland, G. & N. Br.	38 12
" " Connecting R. R.	
" " Willow Street R. R.	
Total	47 12

BITUMINOUS.

From Harrisburg	
" Connecting R. R., G. & N. Br.	14,622 03
" Junction R. R.	30 00
Total	14,652 03

COAL FOR COMPANY'S USE.

Anthracite	2,626 11
Bituminous	300 02
Total	2,926 13

RECAPITULATION

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	85.582 00	35,397 15	i 50,184 05
For Shipment by Canal	29,815 06	1,982 15	i 27,832 11
Shipped Westward via Northern Central R. R.	7,501 06	2,718 15	i 4,782 11
Shipped West or South from Pine Grove	1,346 13	341 12	i 1,005 01
Consumed on Laterals	2,011 12	1,602 12	i 409 00
Lehigh and Wyoming Coal	47 12	3,587 16	d 3,540 04
Total Anthracite paying fr'gt	126,304 09	45,631 05	i 80,673 04
Bituminous	14,652 03	11,012 04	i 3,639 19
Total of all kinds paying fr'gt	140,956 12	56,643 09	i 84,313 03
Coal for Company's use	2,926 13	2,937 06	d 10 13
Total Tonnage for Week	143,883 05	59,580 15	i 84,302 10
Since Dec. 1, 1870	1282813 13	1571027 03	d 88,213 10
Total to date	1426696 18	1430607 18	d 3,911 00

SHIPPED BY CANAL

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	27,023 00	2,083 00	i 24940 00
" Port Clinton	819 00		i 819 00
Total Tonnage per Week	27,842 00	2,083 00	i 25759 00
Since Dec. 1, 1870	87,308 17	60,665 05	i 26645 12
Total to date	115,150 17	62,746 05	i 52404 12

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, May 20, 1871.

	Tons. Cwt.
From Port Carbon	
" Pottsville	
" Schuylkill Haven	27,023 00
" Port Clinton	819 00
Total for week	27,842 00
Previously this year	87,308 17
Total	115,150 17
To same time last year	62,746 05

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending May 20, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal		4,660 00
By Railroad Bas		52,560 00
" West		12,720 00
" South		36,803 00
TOTAL TONS,		108,743 00
For the same period last year.		
By Del. and Hud. Canal	55,279 00	333,107 00
By Railroad East	5,204 00	170,629 00
" West	805 00	30,370 00
" South	15,066 00	141,567 00
TOTAL TONS,	76,354 00	675,703 00

Shamokin Coal Trade.

For week ending May 20th, 1871	11,576 02
Same time last year	9,874 08
Increase	1,701 14
Decrease	
Total amount shipped to date	233,741 00
Same time last year	118,613 07
Increase	115,127 13
Decrease	

Prices for Coal at Mauch Chunk.

May 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein...f.o.b. at Phila	$ —
" " Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board	N. Y. 6 75
Maryland Coal Co. "	6 75

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. May 16. R. A.	W. A.	AT PHILADELPHIA. May 15. R. A.	W. A.
SCHUYLKILL.				
Lump	$—	$—	—	—
Steamer	8 50	—	—	—
Broken	7 70	—	—	— to —
Egg	8 25 to 8 75	— to —	—	— to —
Stove	8 75 to 9 00	—	—	— to —
Chestnut	7 50 to —	—	—	— to —
Pea	—	—	—	—
LEHIGH.				
Lump, (along side)	—	—	—	—
Broken	—	—	—	—
Egg	9 00	9 00	—	—
Stove	10 25	10 50	—	—
Chestnut	9 00	—	—	—
Pea	—	—	—	—
SPECIAL COALS.*				
Diamond Vein	R. A. 7 50@8 00		—	—
New England	" "		—	—
Locust Mountain	W. A.	8 50	—	—
Honey Brook, Le'h	W. A.		—	—
Spring Mountain	" "		—	—
Sugar Creek	" "		—	—
Sugar Loaf	" "		—	—
Old Comp'y's	" "		—	—
Swoyn Creek	" "		—	—
Room Run	" "		—	—
Girardville	" "		—	—
McMichael	" "		—	—
Shamokin	" "		—	—
Lykens Valley	" "	7 25	—	—
Broad Top	" "	7 75	—	—
Hill & Harris	" "	7 25	—	—
Henry Clay	" "		—	—
Powelton	" "	6 25	—	—

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

May, 1871.

No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	—	—	—	—	—	—
Pittston at Weehawken	—	—	—	—	—	—
Lackawanna at do	—	—	—	—	—	—
Wilk'b're at Hoboken	8 00	8 25	8 25	8 25	9 00	8 25
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points see "Freights."

Prices at Baltimore—May, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$— @ —
Pittston and Plymouth, do	— @ —
Shamokin Red or White Ash, do	— @ —
Lykens Valley Red Ash, do	— @ —
Zerba Valley	— @ —
Treverton	— @ —
By retail, all kinds per ton of 2240 lbs.	— @ —
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@4 85
Fairmount and Clarksburg gas, f. o. b. at L. Point	6 00@6 50

Freights.—May, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philad'a.	Anthracite. From East Port, Perth Amboy, and Hoboken.	Anthracite. From Newburg	Anthracite. From Rondout
Amesbury	$2 75		$2 50	$1 75		
Bangor	"		2 30	1 60		
Bath	2 75	2 75	2 30	1 75		
Boston	2 50	2 50	2 50	1 50		
Bridgeport	2 25	2 25	1 75	1 00		
Bristol		2 60	2 00	1 25		
Cambridgeport			2 75	1 75		
Derby			2 00	1 20		
Dighton	2 30	2 35	2 30	— —		
East Cambridge			2 35	1 75		
Fall River	2 25	2 25	2 65	1 25		
Hackensack			1 75	1 00		
Hartford	2 50		2 50	1 25		
Jersey City		2 00	1 40	45		
Middletown			2 25	1 25		
Mystic			— —	1 25		
New Bedford	2 30	2 35	2 00	1 25		
Newburyport	2 75		2 65	1 60		
New Haven	2 25	2 25	1 90	1 00		
New London	2 25	2 25	1 76	1 05		
Newport			2 00	1 25		
New York	2 00	2 00	1 35	45		
Norwalk			1 80	1 00		
Norwich	2 50	2 25	2 00	1 10		
Pawtucket	2 50	2 40	2 30	1 50		
Portland	2 50	2 60	2 30	1 50		
Portsmouth, N. H	2 75	2 75	1 45	1 60		
Providence	2 25	2 25	2 00	1 25		
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 05		
Stonington			2 00	1 25		
Taunton			2 30	1 75		
Warren			— —	1 40		
Washington			1 25			
TO RIVER PORTS.						
Albany		80		55		
Catskill		70		50		
Cockszackie		70		50		
Coeyman's		70		65		
Cold Spring	2 20	70		30		
Fishkill		70		30		
Haverstraw				60		
Hudson	2 20	2 25		40		
New York	"			60		
Nyack				30		
Poughkeepsie				30		
Rhinebeck						
Rondout				75		
Saugerties				40		
Sing Sing				75		
Stuyvesant				55		
Tarrytown				75		
Troy				75		
West Point						
Yonkers				60		

Prices at George't'n, D.C., & Alexandria, Va.

May, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— @ —
Lykens Valley	— @ —
Shamokin Red or White Ash	— @ —
Trevorton and Zerba Valley	— @ —

Prices of Gas Coals.

May, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y.

Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 75	@-1 75
Gowrie	1 75	@-1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co	$7 50 @- —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @- —
West Fairmount Gs Coal	8 00 @- —

AT PHILADELPHIA.

Powelton	$7 75

Prices of Foreign Coals.

May, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" " House	—@16 00
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel	18 00@20 00

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

May, 1871.
Closed for the winter.

Foreign.
Newcastle and Ports on Tyne, per keel of 21 1-6 tons.....£14 00@£16 00
Liverpool, 5 per cent primage.....13s @1s 6d on.

TO NEW YORK.

Provincial.
Sidney.....$ —
Lingan.....—
Cow Bay.....—
Port Caledonia.....—
Little Glace Bay.....—

TO BOSTON.

Sydney.....$ —
Lingan.....—
Cow Bay.....—
Port Caledonia.....—
Little Glace Bay.....—

Rates of Transportation to Tide Water.

Closed for the Season.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon.....$1 85
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton.....$0 98
C. R. R., N. J., Easton to Elizabethport.....1 42
Shipping expenses at Elizabethport.....25
Warfage.....10
Total.....$2 75

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton.....$0 98
C. R. R., of N. J., Easton to Pt. Johnson.....1 45
Shipping expenses.....25
Warfage.....10
Total.....$2 78

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton.....$ 98
Morris & Essex R. R. Easton to Hoboken.....1 45
Shipping expenses.....25
Warfage.....10
Total.....$2 78

TO SOUTH AMBOY.

L. V. R. R.....98
R. & D. R. R.....
Cam. & Am. R. R.....1 40
Shipping Expenses.....10
Wharfage.....10
Total.....$2 7

PENN HAVEN TO ELIZABETHPORT.

L. V. RR Penn Haven to Easton.....1 15
C. RR. of N. J. Easton to Elizabethport.....1 2
Shipping expenses.....5
Wharfage.....0
Total.....$ 2 72

METALS.

NEW YORK, May 26, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb.; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb: Pig, $7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	30 00@35 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, Englisband American	— —@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 50
Bar, Refined	75 00@ 77 50
Bar, Common	85 00@ — —
Scroll	100 00@120 —
Ovals and half-round	95 00@105 00
Band	92 50@ 95 —
Horse Shoe	95 00@ — —
Rods, ¾ to 3-16 inch	82 50@120 —
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, assto Nos. (gold)	11¾@— 12
Sheet, Single, D, and T. Common	—4½@— 6
Sheet, Galv'd, Nos. 14 to 28 9 and 11c. Nos. 27, 28, and 29, 11½@14	
Rails, English (gold), ℔ ton	56 00 @58 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15	@— 18
English Spring (2d and 1st quality)	— 7	@— 10
English Blister (2d and 1st quality)	— 10	@— 17
English Machinery	— 11½	@— 14
English German (2d and 1st quality)	— 12	@— 14
American Blister "Black Diamond"	— —	@— 12
American, Cast, Tool do.	— 16	@— 17
American, Spring, do.	— 9	@— 11
American Machinery, do.	— —	@— 12
American German, do.	— 9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	—@— 30
Copper Bolts	—@— 32
Copper Braziers, 16oz. and over	—@— 32
Copper, Nails	36@— 38
Copper, Old Sheathing, &c. mixed lots	—@— 19
Copper, old, for chemical purposes	20@— 21
Copper, American Ingot	21¾@— 21¼
Yellow Metal, New Sheating & Bronze	—@— 22
Yellow Metal Bolts	24@— —
Yellow Metal Nails	—@— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb: Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	$— —@— —
Spanish (gold)	6 12½@6 18
German, do.	6 12½@6 18
English, do.	6 15 @6 50
Bar (net)	— —@8 75
Pipe (net)	— —@10 25
Sheet	— —@10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.: Plate and Sheets and Terne Plates, 25 ℔ cent.: Roofing 25. ad val.

	Gold ℔ lb.
Banca	— @38
Straits	— @32¼
English	— @32

PLATES.

	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ℔ box	$8 50 @8 75	$9 75 @10 00
I. C. Coke	7 25 @7 75	8 25 @ 8 75
Coke Terne	6 12½@7 12½	7 00 @ 8 25
Charcoal Terne	7 75 @8 50	9 00 @ 9 75

ZINC—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½cts. ℔ lb.

Sheet, No. 9 to 11 Foreign ℔ lb.	— 8¼@— 9

REMARKS.

IRON—The market for Scotch Pig remains very quiet, the demand being still confined to small parcels to supply the immediate wants of the Trade, and to effect any transactions of magnitude lower prices would have to be accepted, the market closing weak and irregular. We have only to notice sales of 100 tons Glengarnock at $31 50; and to arrive 300 tons Garthsherrie, $32. American Pig continues very firm, owing to the limited supply—200 tons No. 1 Glendon sold at $34, and 225 tons No. 2 ex, $33 — contract was closed on Thursday for 9,000 tons Water Pipe Castings for New York City, which will consume the year's product of one furnace. There has been a little more inquiry for Wrought Scrap, and sales have been made of 350 tons here, and 150 do. Philadelphia, on private terms. New rails continue in active demand at steady prices, and we notice sales of 4,000 tons, 56 lb. English, part to arrive, 400 do. old Double-headed, $40, gold; and 200 do. same, to arrive at Quebec, Can., on private terms. The market for Refined Bar continues flat, but nominally unchanged. Westmore & Co. (agents for Burden) quote Burden's Extra Refined Iron, Round and Square 2 inches to 1¼ inch, $105a$135; do. 2¼ to 4 inch, $100 to $125—Flats 1¼ to 4½ x ¼ to 1 inch to 4 x 3, $105 to $120, and 7 x ¼ to 1, to 8 x 1¼ to ½, $115a$130—Flats ½ x ¼ to ½ x ¼ to 1 inch, $145a$110—and Horse Shoe $105, a reduction on all of $10 per ton, all less 5 per cent. for cash—H. B. & S. (Burden's second quality) regular sizes, is quoted at $80 net cash. We understand the Ulster Iron Company's prices agree with the above. Russia Sheet is quoted at 11¼a12 cents gold, without any recent sales.

LONDON, May 11, 1871.—The following statement of shipments is taken from S. W. Hopkins & Co.'s London Monthly Circular:

EXPORT OF RAILS FROM GREAT BRITAIN.

To the—	Month end'g Ap'l 30. 1869. Tons.	1870. Tons.	4 mos. end'g Ap'l 30. 1871. Tons.	1869. Tons.	1870. Tons.	1871. Tons.
U. States	33 565	37 016	32 456	116 077	117 805	135 421
Russia	21 166	20 619	5 732	29 594	24 725	14 742
Oth. Ctrs.	30 416	39 241	39 475	87 682	163 497	101 989
Total.tons.	85 147	96 878	77 663	233 353	306 027	252 142

Old Iron to all Countries	9 548	8 080	10 656	30 881	31 538	32 426
Pig Iron to U. States	17 098	6 622	19 080	42 869	28 287	54 449

LEAD—The stock of Pig is light, and hence, though the demand conntinues limited, prices are sustained. Sales have been made of 20 tons Spanish at $6 15, gold; and 59 do., on private terms. Bar, 8¾c.; Sheet and Pipe, 10¼c., and Tin-lined Pipe, 15c.—all usual discount to the Trade.

COPPER—The manufactures of Copper and Yellow Metal are steady at our quoted prices. The business in Long continues to be limited to small lots to meet the immediate wants of manufacturers; the sales embrace about 150,000 lb. Lake, in lots, at 21¼c. Baltimore and Tennessee are scarce, and firm at the same price as Lake.

TIN—The market for Pig is at a stand, and there has been no business; holders ask 32½ cents for Straits, 32 for English, and 38 for Banca, all gold. In Plates there have been considerable transactions at steady prices. Coke tin are in small supply, and Charcoal Terne are still very scarce Sales have been made of 1500 bxs. Charcoal Tin at $8 37½ a8 62½ for I. C.; 400 do. I. C. Coke, $7 62½; 200 do. B. C. Coke Terne, $6 12½, all gold; and 2,0000 bxs. ¼ X, and Extras Charcoal Tin, for shipment, on private terms, but at full prices.

SPELTER—Foreign remains very dull, and prices are nominally as before, say 5½a6 cents. gold.

STEEL—There is little doing, and no change in prices to report.

Zinc.—Spelter Silesian 5¼c., gold; Spelter Missouri 9c., currency; Zinc Sheet Belgian 7¾c., gold; Zinc White French dry 10½c., gold; Zinc White American dry 7c., currency; Manganese Pyrolusite 5c., currency; Manganese Powder 5½c., currency.

Mining Stocks.

NEW YORK, May 26, 1871.

The following are the quotations of Petroleum Stocks, as reported by the New York Mining Stock Board:—

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	—	—
Bennehoff Run	15	—
Blood Farm	—	—
Brevoort	30	—
Bliven Oil	35	50
Buchanan Farm	35	—
Central	66	—
Clinton	—	—
Home	160	200
Phillips Pet	—	—
Rynd Farm	33	45
United Petroleum Farms	23	—
United States	—	—
National	—	—
New York & Allegheney	—	—
Northern Light	—	—
Pithole Creek	—	—
Rathbone Oil	24	—
Second National	—	50
Sherman & S	—	—
Tarr Farm	—	—

GOLD STOCKS.

The following are the quotations of Gold Stocks. A sale of 500 Grass Valley is reported this A. M. at 15.

	BID.	ASKED.
American Flag	16	25
Bates & Baxter	30	—
Benton	—	7
Black Hawk	28	40
Central Gold	10	12
Cons Gregory	40	50
Grass Valley	14	18
Gunnell	17	—
La Crosse	25	28
Liberty	—	—
Mariposa prf	—	—
Rocky Mount	6	—
Quartz Hill	28	—
Smith & Parmlee	41	—
N. Y. & Eldorado	—	—

San Francisco Stock Market.

We have reports from the San Francisco Mining Stock Board, per Associated Press, dated, May 22, as follows:—

Savage	52
Yellow Jacket	72½
Kentuck	91½
Chollar Potosi	52
Gould & Curry	83
Belcher	139
Imperial	49
Amador	—
Crown Point	268
Hale & Norcross	—

The Slate Trade.

NEW YORK, May 10, 1871.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE IN NEW YORK.

Vermont purple, 1st quality, per square		..	$6 50@ 7 00
" green, 1st	"	" ..	6 50@ 7 00
" red, 1st	"	" ..	15 00@16 00
" variegated,		" ..	5 75@ 6 20
d. b'k and d'k blue, 1st qual.		" ..	6 00@ 7 05

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending May 20, and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	200	1,075	1275
New York, *and Middle Granville Slate Co	200	1,270	1470
†American Slate Co	....	....	....
Benj. Williams	..	445	445
Jones & Williams	....	20	20
Eagle Slate Co	....	60	60
Mettowee Slate Co	30	235	265
Albany Slate Co	130	115	245
H. W. Hughes	....	30	30
Total	....	....	—

MILL STOCK, MANTLES, &C.

NO. OF CASES SHIPPED BY	Week.	Prev'ly.	Total.
Eagle Slate Co	cars....	....	....
Penrhyn Slate Co	" 33	1,512	1,545

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &C.

NO. OF CARS SHIPPED BY,	WEEK.	PREVIOUSLY.	YEAR.
Eagle Slate Co	cars. 2	10	12
Penhryn Slate Co	....	....	....

* Sales made together this season.
† Consolidated Sales.

PENNSYLVANIA SLATE TRADE.

The following is a weekly statement of Roofing Slates, School Slates and Mantels, shipped from Slatington, via Lehigh Valley Railroad for last week, ending May 20, 1871.

ROOFING SLATE.

Jones & Williams	635	squares.
Locke Slate Co	—	"
D. Williams & Co	—	"
Columbia Slate Co	70	"
Jones & Town	35	"
H. Williams	280	"
J. Anthony	105	"
Thomas & Bros	35	"
Keystone Slate Co	70	"
Enterprise Slate Co	35	"
W. F. Fagely	35	"
Lehigh Slate Co	—	"
H. J. Hankee	18	"
W. Hughes	—	"
F. J. Settler	—	"
Saylor & Morgan	105	"
American Slate Co	35	"
Kuntz & Woodring	105	"

SCHOOL SLATE.

D. Williams	56	cases.
A. W. Lerch	43	"
Lock Slate Co	10	"
Lehigh Slate Co	—	"

MANTLES.

Lehigh Slate Co	50	"

BLACK BOARDS.

Lehigh Slate Co	5	"

BY THE L. S. RAILROAD.

ROOFING SLATE.

Heimbach Slate Co	35	"

BLACKBOARDS.

Heimbach Slate Co	4	cases.

FROM TREICHLER'S STATION.

Eagle Slate Co	70	squares.
Continental Slate Co	200	"

European Engineering Items.

The Arenberg' sche-Actiengesellschaft, for mining and iron industry, pays a dividend of six per cent. for 1870; the Hamburg-Berlin Railway Company, ten per cent.; the Elbe Steamship Company, twenty per cent.

A very fair arrangement has lately been made in the Royal establishments of Saxony, in regulating the working hours, which is well worthy of imitation. Amongs other improvements, the hours have been reduced to ten; in June, July, and August, work has to begin at six o'clock, A. M., and an interval for dinner of two hours has been allowed (eleven to one). For overtime and Sunday work, extra pay to the amount of 10 per cent. is allowed.

We take the following short data from the report made by the Ministerialrath Ritter von Tunner, to the Austrian Ministerium for Agriculture. This gentleman was sent by the Austrian Government on a journey to Russia in 1870, to inspect the Russian ironworks and States. After having learnt from experience how very quickly the ordinary rails are wasted on all roads of large traffic, or situated in elevated (mountainous) districts, it has been the general endeavor in late years to secure their longer endurance by greater hardness of the heads and the beds. To this purpose, either a phosphoric or better a steel-iron (puddle bar) is used, or better still, the whole rail is manufactured from Bessemer metal. The use of a harder iron or steel renders the make difficult, and facilitates the breaking of the rails, when in use. Doubtless, it was from the apprehension of the breaking of the rails, that no trials have as yet been made in Austria or Germany, of hardening the rails by sudden refrigeration. Accidentally it was found out in Russia, in the Demidoff Rail Works, at Talda Nischne, some years ago, that the value of rails from adequate material is greatly increased by hardening them by means of quick refrigeration, and since that time the ready rolled and cut rails are hardened in water on all railworks of Russia. On the rail-rolling mill of Mr. VON PUTILOW, near St. Petersburg, where the rails are manufactured with heads of a tolerable soft puddled steel, the rails are allowed to lose nearly all the visible heat before they are thrown into the water; at Talda, as well as on the Aeraric Works at Wahkinky, where the whole rail is manufactured from hard iron, namely, head and foot from welded plates, it is immediately thrown into cold water. If this has been proved good for the Russian railroads, which are used in winter at a temperature of 30 to 40 degs. R., it must be the more useful for our country.

It is certain that the danger of breaking depends entirely, with good hardened rails, on the amount of hardness, the carbonization of steel-iron, and the temperature under which the hardening has been effected, and there can hardly a sound reason be found why a hardening of rails should not be allowed, whilst it is adopted in so many other cases in a higher scale with articles where breaking would scarcely be of less consideration than with rails. Doubtless, such a process of hardening by quick refrigeration is more effective, and accompanied with less danger, than is the case by the application of a phosphoric cold-short iron. But even with pure iron, the danger of breaking would probably be less under the same degree of hardness which is found in unhardened rails of a small carbonation by the quick refrigeration or hardening, and certainly the manufacture of rails from little carboniferous iron is easier and cheaper.

Smelting in Utah.

By far the greater part of the silver ores of Utah Territory are argentiferous galena, and its products of decomposition. The principal mines worked at present are within easy reach of the railroad, and it pays, therefore, well to extract the lead as well as the silver. The business of smelting is rapidly growing, and has already assumed considerable proportions. There are six smelting works of an aggregate capacity of forty eight tons per day in active operation in the Territory, an three more furnaces, of a daily capacity of fifteen tons each, are under construction, and will be ready for use in a short time.

The success of some of the mines in the neighborhood of Salt Lake City during the past year has again created an interest in mining in some of the Eastern cities, and we understand that several prospecting parties have been sent out to Utah by organizations of capitalists. These proceedings may possibly lead to the desired results, *i. e.*, the discovery of rich mines; but it is our opinion that prospecting is done much better by our Western pioneers, who have made it a business, in which they have, after years of active practice, acquired a degree of skill which cannot be expected from new-comers, and which is rarely found even among the best metal-miners of the Old World.

90TH AUCTION SALE.

80,000

TONS SCRANTON COAL,

ON WEDNESDAY, MAY 31, 1871.

NEW YORK, May 22d, 1871.

The DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY will sell, by Messrs. JOHN H. DRAPER & CO., Auctioners, at the Company's Salesroom, 26 Exchange Place, corner of William street, New York, on WEDNESDAY, MAY 31st, at 12 o'clock noon.

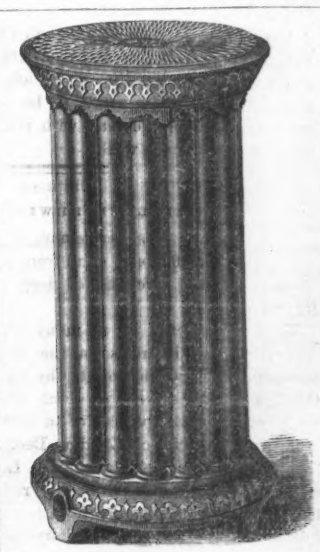
80,000 Tons

of Coal, from the Lackawanna Region, of the usual sizes, deliverable at their Depot, Elizabethport, N. J., during the month of June, 1871.

The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of, or on behalf of the Company. The conditions will be made known at the time of sale.

TERMS: Fifty cents per ton, payable in current funds on the day of sale, and the balance within ten days thereafter, if required, at the office of the Company.

SAMUEL SLOAN, President.



JOSEPH NASON'S VERTICAL TUBE RADIATORS, IN VARIOUS SIZES AND PATTERNS.

JOSEPH NASON & CO., 61 BEEKMAN STREET, corner of Gold street.—WROUGHT and CAST-IRON PIPES; all kinds of STEAM and GAS FITTINGS; Apparatus for WARMING and VENTILATING BUILDINGS.

JOSEPH NASON. HENRY R. WORTHINGTON.

my29-6m

J. THOULET & C. RASCHER, MINING AND CIVIL Engineers, Maps, Topographical and Mining Surveys, Superintendence of Mines, Metallurgical and Chemical Works, Examinations and Reports on Coal and Metallic Mines, Assays, etc., Oriental building, 122 Salle street.

The New System of Wharfs.

After several months spent in making careful surveys of the shores of our island, and in the consideration of various plans designed to afford a convenient and durable system of piers or docks, the Board of Commissioners have issued the following circular letter:

Department of Docks, New York, May 26, 1871.

In arranging a new system for the accommodation of the shipping-business of New York, the chief object has been to render it as simple and economical as practicable. The English system of tidal docks has been rejected as too expensive, and as inapplicable here, the variations of the tide being so small as to render such a system unnecessary, while our ample and secure anchorage grounds and extensive water-front render it entirely practicable to furnish accommodation for any future commerce by a much more simple system.

The main features of the new system are a wide river-street, bounded by a permanent wall of masonry, and much more ample piers than the present. On the North River side the river-street will be 250 feet in width, on the East River 200 feet as far as Montgomery street, thence 150 feet wide to Grand street, thence 200 feet to Thirty-first street, thence 175 feet wide. This width will afford ample space for any future railway system, as well as sufficient room to permit easy access to the piers, and uninterrupted transit along the river front. None of the new piers will be less than 60 feet wide, except in particular cases, where only one side of the pier can be used (as in those adjacent to ferry slips), others 80 feet, and others 100 feet wide. It is proposed to arrange to cover all piers that require it with a suitable one-story shed, affording the requisite facilities for handling freight. It is proposed to leave the erection of storehouses of several stories entirely to private enterprise, under the direction of the Board. The slips will be made of a width adequate to the purpose for which they are to be used. At the River Wall there will be a depth of water of 20 feet, except where the absence of piers will permit large vessels to lie alongside, where the depth will be 25 feet, or more.

Into the construction of a limited number of the piers, stone and iron will enter, but the great majority will be of wood, built in the best manner. Considerations of the necessary economy lead to this conclusion, for the large wooden piers can be so made as to afford all the necessary facilities at a comparatively small outlay. The piers will all be on supports of such a nature as to allow free passage to the water.

Under the present system, there are from Sixty-first street, North river, to Fifty-first street, East river, a wharf line of 150,293 square feet, or 28½ miles, with a total pier area of 2,323,668 square feet. By wharf line is meant all that portion of the river wall and piers that vessels can approach. Considerable portions of this wharf line are practically useless from insufficient depth of water and other causes. Under the new system, there will be a wharf line of 37 miles, and a pier area of about 5,105,000 square feet, from Sixty-first street, North river, to Fifty-first street, East river.

It is proposed, first, to complete the system from Grand street to West Eleventh street, within which limits there will be a wharf line of about 21½ miles, sufficient to accommodate the commerce of the city for some time to come, when the advantages of the new system is taken into consideration.

The wide river street and the permanent wall of masonry have, we believe, formed a part of almost every plan submitted to the Board, and will without doubt meet with universal approval. The provisions leaving the erection of permanent store-houses to private enterprise, and first experimenting with iron and stone, before deciding to adopt them exclusively in the construction of piers, are, in our opinion, eminently wise.

The Darien Expedition.

Long ago, we took occasion to say that, while we would not discourage thorough explorations of all routes alleged or suspected to be feasible for a ship-canal across the Isthmus, we believed at the same time that the line of the Panama railroad would be found the best, if not the only practicable one. The experience of the Selfridge expedition corroborates this view. In spite of the repeated enthusiastic dispatches received during the progress of the work, it now appears (if we may trust the latest reports) that the "discoveries" made are neither new nor valuable. The single statement that the summit on the line is more than six hundred feet above the sea, and that Captain Selfridge will recommend a ship-tunnel as the means of completing the communication between the two slopes, seems to us conclusive against the vaunted route.

Meanwhile, why is not the Panama route seriously examined? The public is treated to many reports on Tehuantepec, Nicaragua and Atrato; but the line which on preliminary examination promises most seems to be studiously avoided. Are private speculators playing with the interests of nations and the commerce of the world?

Obituary.

THE LATE EDWIN BYNNER.

The death of this gentleman, which occurred Dec. 21st, 1870, from the effects of a fall from a street car, in the city of Boston, created a feeling of deep sorrow wherever he was known.

He was connected for so many years with various railroad and steamboat interests in the East, and so well known throughout the whole country by railroad and shipping men, that his death deserves something more than a passing notice, or the conventional phrases of an ordinary obituary paragraph.

Born in the city of London, Dec. 28th, 1816, he inherited from his father, a Welshman, and a London merchant of high standing, that love of truth—that rich and peculiar humor—that high sense of personal honor—and that indefatigable industry and energy that especially distinguished him; while, from his mother, an Englishwoman of good family, he derived those more brilliant qualities by which he will be chiefly remembered—the ready and sparkling wit—the large gift of expression—the exceptional, imitative, and histrionic abilities—and the strong social inclinations which especially endeared him to his immediate and intimate associates, and won for him an innumerable host of friends in all parts of the country.

Heavy and irretrievable losses determined his father upon coming to the United States before the subject of this sketch had completed his sixteenth year. Preferring to remain in New York rather than go West with his family, he was from that time thrown upon his own resources. Often perplexed, yet never disheartened, manfully he struggled on through several years of change and privation, during which he turned his hand to any respectable employment that offered remuneration—a course which admirably fitted him for his after-life of vicissitude and action.

Early married, the support of a large family called into play all his energies and activities. Residing alternately in New York and Massachusetts, with a marvellous aptness and versatility, he applied himself to an almost incredible number of pursuits, filling at times the most diverse positions, and always well and efficiently.

Commencing life in New York city in connection with one of the large daily newspapers, he acquired a practical knowledge of the details of printing, which he subsequently turned to good account. He was, at different periods of his career, engaged in the coffee and spice trade—in groceries—in flour and meal—in book-selling and publishing—and variously acting as a district school-teacher, a farmer, an auctioneer, a railroad station agent, and an editor; besides being a political speaker and writer of no mean order. Of late years he has been employed in railroad and steamboat interests in the Atlantic States, and, by diligent study, had acquired as thorough a knowledge of the history, changes, conditions, reforms, and needs of our freight transportation as any man in the country.

In person, Mr. Bynner was of medium stature, with a compact, well-knit frame; a large, intellectual head; a handsome, expressive face; combining a *personnel* at once pleasing, manly, dignified, and impressive. He was a man of rare talent and versatile genius, gifted prodigally by nature with all those qualities which would have fitted him to adorn and illustrate the higher ranks of literary or public life; with wit, humor; imagination, and largeness of expression enough for a poet; with eloquence, declamation, and fire enough for an orator; with invention, knowledge of human nature, and keen appreciation of the dramatic and ludicrous, enough for a novelist, with varied experience, judgment, caustic humor, facility of expression, and pugnacity enough for a journalist or controversialist; and with histrionic abilities that would, if developed upon the stage, have placed him with the world's great comedians—he has lived and died unknown to the world at large, a victim of circumstances.

Constrained in the fierce struggle for the outward necessities of life, (which the wants of a growing family made ever more and more imperative,) to neglect the higher lights within, his was, in one sense, a wasted life—wasted as to all the higher possibilities—a jewel not fitly polished.

Mr. Bynner was a genius in all but the great patience with which those "not born to die" have nourished and fanned the the divine fire within them, till it burst forth a perennial flame in the eyes of men.

He lacked aim, and persistence, and while conscious of his own powers he yet distrusted their promises.

He lacked, too, the courage of those who wait—and though often fretting in the harness, impatiently turned his deft hands to any task which promised soonest to satisfy the clamorous needs of the hour.

He was large and catholic in spirit, with an abounding charity for any real weakness, and a thorough contempt for cant, and all social, and political shams.

Liberal in religion and politics, and all his views of life and judgments of men, he had an abiding hatred for meanness and bigotry, wherever, or however displayed.

With social instincts, native and developed, he combined a personal magnetism which never failed to make his presence felt wherever he went, and which made him always a centre of attraction.

In every near relationship of life he proved himself faithful, tender, and true; whilst to the home circle his presence ever brought gladness and sunshine.

Mr. Bynner was a religious man in the best sense of that often misused term. His belief in God, and in the truths Christ came to teach, was no mere abstraction, but a vitalizing principle—which, like the keystone of an arch, upheld and strengthened his whole being. He made no outward profession, yet in his sympathies and charities he followed closely in the footsteps of Him who "went about doing good," and doubtless, ere this, has heard "the King's" own verdict: "Insomuch as ye have done it unto the least of one of these my brethren, ye have done it unto me."

European Engineering Items.

From a Hamburg letter in the columns of the *Colliery Guardian* we extract the following items of news:

The first German Reichstag (Parliament) is now deliberating on a Government bill on the liability of railway companies, mines, etc., for accidents and loss of lives occasioned through negligence, etc. The greatest strain being put on the railways, the delegates of the German engineers and miners have petitioned to extend this liability also to all undertakings, whatever their nature, including iron-works, steamships, agriculture, etc.; and, further, to put the liability on such a footing that only in case it can be proved that the accident was caused by *force majeure*, ("his own fault,") shall the owner be liable to pay full damage.

We have just received the fourteenth annual report of the Zwickau Coal and Transportation Company. The disturbances of 1870 have unfavorably affected both production and transport at these coal works, and the fire in the pit two years ago, followed by the breaking down of a shaft, have still further impeded the progress of industry. The entire production of 1870, therefore, only amounted to 151,978 cars (of six bushels), which is less, by 33,000 cars, than that of 1869, and by 56,000 cars than that of 1868. The net profit, however, in consequence of the enormous prices secured during the winter, amounted to 80,195 thalers, being only 3,195 thalers less than in 1869. Of this, 67,024 thalers have been divided as dividends of 16 thalers per share of 90 thalers.

The total lengths of the Italian lines at the end of 1870, as compared with 1869, were:

	1869. Kilometres.	1870. Kilometres.
Upper Italian line	2,665	2,805
Roman "	1,178	1,178
South "	1,303	1,307
Calabro-Sicilian "	360	529
Turin-Cirié "	21	21
Mont Cenis "	27	27
Total	5,563	5,867

The use of steam power in the kingdom of Saxony has greatly increased, not only in the manufacturing, but also, and chiefly, in the agricultural districts. The following table shows the increase:

	1846.	1856.	1861.	1870.
Boilers	252	719	1,300	3,511
Locomotives	47	147	203	373
Steamship engines	3	12	13	29

The total length of the Riga line amounts to 5,340 metres. All curves are 130 metres. The weight of the locomotive and tender, with vertical boiler, is 12,500 kilogrammes. The speed is, for security's sake, a very slow one. The whole train (and the passengers' compartments, also, for themselves) can be stopped almost instantaneously. The connection between Europe and North America is at present maintained by eight steamship lines, five English, two German, and one French, with together 106 steamers. 555 double voyages have been made during the past year, and 302,148 passengers, and 1,700,000 tons of goods, have been forwarded. The Hamburg American Steam Packet Company, alluded to on a former occasion, owned seven steamers, of a tonage of 3,000 to 3,500 each, running to New York, and touching Havre, Cherbourg, and Plymouth. In 1870, the activity of this company was largely interrupted by the war, and only 69,000 tons of goods were shipped, 28,093 passengers forwarded; 22,366 to, and 5,727 from America. A branch line is now established between Hamburg, Havre, Havana, and New Orleans, by three ships of a total tonnage of 7,587 tons.

The complaints respecting the impossibility of discharging and forwarding goods, have only partly subsided, and the railway companies have, in consequence of this unsatisfactory state of things, opened a full Sunday service for all classes of goods, which will probably tend, in no small degree, to the early evacuation of the "Sandthorquai." English colliery, boats are coming in daily, and, having their separate anchoring place, they are soon emptied, and give way for others; freights, consequently, are well maintained, likewise for iron, and especially bar iron. This latter article is extensively used here and in the manufacturing places of the North of Germany, and chiefly imported from England on account of the homogeneous quality, which favorably distinguishes the English iron from that of Sweden. The demand for the latter has greatly abated. Trials have been made, especially during the winter, to place Westphalia coals here, and have, to some extent, succeeded, as the quality is said to be equal to that of English coals. During the present incapability of the railroads to move any transports of any considerable amount, the scheme has been dropped, and will, probably, remain in abeyance, as the difference in freights is naturally much in favor of the English coal. Large tenders have, therefore, lately been given by our Government establishment chiefly for Hartley steam coals. We have to record several fatal accidents during March and April. The first took place at Neuessen, in the borough of Altessen, on the 13th of March, in the evening, when twelve miners, after finishing work, were about to ascend in the usual box. When they had nearly reached the surface, the pulley (head wheel shieve) broke, and the unfortunate men were thrown down into the fearful depths; nine of them were killed on the spot, the remaining three were severely wounded, and their recovery at the time despaired of. At Hagen, the house of the innkeeper Dreitelhoff, in the Bergstrasse, was blown up on the 14th of March. The workmen occupied at the Volme railway used to dry the dynamite cartridges they made use of in breaking down the rocks on the hearth of the house, and this was the cause of the explosion. A woman was found dead under the ruins, and several persons have been more or less severely injured. On the 3d of April, an explosion of fire-damp took place in the coal pit Shamrock, near Herne, in Westphalia. Seven miners were killed and thirteen fearfully injured. By a similar accident, fifteen miners have been killed in the Tokode coal pit, in the Gran Comitat, Austria. Bremen, the second shipping port of Germany, has severely suffered from the war; the total amount of exportations in 1870 being 9,899,898 gross cwts., in value, 90,947,474 thalers—3,971,045 thalers, or 4·17 per cent., less than in 1869. The transatlantic exportation amounted to 19,937,146 thalers, against 22,298,013 thalers in 1869. Exports have been as under:

	1870. Thalers.	1869. Thalers.
To America	17,518,124	20,648,518
To England	4,122,066	4,369,311

The Senate of Bremen intends to erect works for a sufficient supply of water to the town, which has long been felt a painful necessity. Tenders are invited for—

A. The engines and iron (high level) reservoirs.

B. The network of tubes and appendages.

C. The erection of the buildings, filter-beds, etc., etc.

Conditions, plans, etc., can be received for each of these from the Baudirection, Abtheilung II., Werder No. 21, Bremen, and tenders must be sent into these same offices by the 1st of June, 1871.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., WILLARD P. WARD, M. E., } Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.*

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THE SCIENTIFIC PUBLISHING COMPANY.

WILLARD P. WARD, MANAGER,

37 PARK ROW,

P. O. BOX 4404. NEW YORK CITY.

A CHANGE OF PROPRIETORS.

THE ENGINEERING AND MINING JOURNAL, having been purchased by the Scientific Publishing Company, has passed from the control of its former publishers; but will remain, as far as its character and contents are concerned, in the hands which have guided it hitherto. As our readers will observe, the editorial management is unchanged. Whatever improvements are contemplated, will be announced in due time and in the only way which interests the public, namely, by the actual appearance, not by the mere promise of it.

DISSOLUTION OF COPARTNERSHIP.

NEW YORK, May 15, 1871.

The partnership heretofore existing between the subscribers, under the firm name of WESTERN & COMPANY has this day been dissolved by mutual consent.

BENJ. R. WESTERN.
CHAS. C. WESTERN.
R. W. RAYMOND.

NOTICE OF COPARTNERSHIP.

NEW YORK, MAY 15, 1871.

The subscribers have this day formed a copartnership for the purpose of carrying on the business of general Publishing and Patent Agents, under the firm name of WESTERN & COMPANY, at No. 37 Park Row, New York.

BENJ. R. WESTERN.
CHAS. C. WESTERN.

VALEDICTORY.

IN severing, with the present number, our connection with the "ENGINEERING AND MINING JOURNAL," we feel that we cannot withdraw from the scene of our labors for the past five years, without some few words of farewell to our numerous patrons, and of acknowledgment and thanks to our brethren of the press for the generous support they have always accorded us.

Entering, as we did, on a journalistic field hitherto almost untrod, we have always endeavored to make our paper the representative of the Engineering and Mining interests of the country, and to keep our readers supplied with the best and newest information relating to those professions. With what success our efforts have been attended, we leave the public to judge.

As our successors have long been connected with us in the publication of the JOURNAL, their ability is too well known to need any eulogy from us; their names and professional standing are a sufficient guarantee for the future excellence of the work they have undertaken.

Although retiring from the JOURNAL, our connection with our younger offspring, the "MANUFACTURER AND BUILDER," will still be maintained. To its care our undivided attention will be given, and while asking for the future the same kind consideration of the Press, we hope by our efforts to merit the continuance of the flattering evidences of success which a generous public has hitherto bestowed upon us.

WESTERN & COMPANY.

Narrow-Gauge Newspapers.

WE have had occasion several times to criticize the ignorance and credulity in scientific and professional departments of the New York *Tribune*. That journal is somewhat noted for combining integrity of purpose with extreme susceptibility to delusions. Probably no newspaper is more jealously guarded against the intrusion of contributions suspected of an "axe-grinding" purpose; yet certainly no other newspaper has more frequently fallen a victim to the wildest assertions of scientific dreamers or charlatans. Over and over again, it has announced that this, that or the other industry was about to be revolutionized by some new and startling discovery, though of late, its editorial endorsements are qualified by the meek interpolation, "If what Mr. So-and-so claims shall be substantiated—and we are confidentially assured that it will be—then a complete revolution * * * American Industry" etc. The Codorus steel-flux or ore; the furnace out west five feet in diameter and fifty feet high, tapering upward; the eighty per cent. iron ore; and numerous other instances, might be cited. The cause of all these blunders is the intrusting of editorial work in these technical departments to mere Bohemians, who cannot tell what is demonstrably absurd, and whose imaginations are most vividly impressed with whatever appears most likely to "confound the experts."

To criticisms of this kind, the *Tribune* makes no reply, in the way either of acknowledgement or of defence. The policy of most large newspapers is to maintain at all hazards their own reputation for infallibility. If they assert a thing which is mistaken, anybody aggrieved may write "briefly and courteously" to the editor; and his communication, duly mutilated, condensed and "toned down," appears in a corner devoted to "the public," while the young gentleman who does the "leaded brevier" takes no account of it, unless he can find in it some point on which to hang a joke or repartee. But if the mistake in statement refers merely to science, and nobody is personally injured by it, or feels sufficiently interested to bestow a gratuitous article on the journal in refutation of it, the public may wait in vain for a retraction or a correction. Other and better informed journals may offer to their own subscribers the true statement; but the body of readers which first received the error must be patient until some other young gentleman on the editorial staff, in a future article, contradicts his predecessor, whose assertion has been forgotten by the managing and supervising censor.

It is part of this system of unstable equilibrium, to maintain the attitude, in general, of omniscience and judicial authority. If any one catches you in a crass blunder, you must say nothing about it, but wait till you think you have caught *him*. Possibly some such motive animated the following paragraph, which recently appeared in the *Tribune*:

"On the 27th of April an article was published in the *Tribune* which advocated the system of 'narrow-gauge railroads.' The ENGINEERING AND MINING JOURNAL of May 16th has an article on the same subject, embodying similar facts and estimates, and apparently derived from similar sources. The article is a little late, but will probably attract the attention of the few who 'put off till to-morrow what should be done to-day.'"

The *Tribune* is apparently not aware that this journal has been publishing articles on narrow-gauge railroads for more than a year past; that the article of May 16 was explicitly an extract from the report of a Massachusetts Legislative Committee, and that the difference in time between April 27 and May 16 is no more than the difference in character between a hastily printed daily and a slowly and carefully prepared weekly requires. In this instance, the *Tribune's* haste has done it little harm, since it employed "similar sources" to ours; but its history witnesses that its sources are not always "similar"; and perhaps true wisdom would require it to think less of the news and more of the truth.

Even in the present instance, its enterprise has outrun its judgment. As usual, it has declared an impending "revolution" in railway practice; and, adopting blindly, and extending recklessly the arguments in favor of the narrow gauge, it has prophesied and demanded for that system an application far too wide and comprehensive. We recommend to the *Tribune* a perusal of the files of the ENGINEERING AND MINING JOURNAL, as a means of correcting its judgment and modifying its furious taste for novelties.

Since writing the above, we find in the *Tribune* of May 25 a brief notice of the Wilkesbarre meeting of the American Institute of Mining Engineers, in which allusion is made to "a paper by Mr. RAYMOND of New York, on 'Stamps, their effect and economical value,' *a subject pertaining entirely to the production of oil, and showing the impossibility of basing an accurate estimate of the capacity of a well by the workings of a stamp*"

This ghastly burlesque on Bedlam is offered by a newspaper which boasts of its intelligent management. "Enterprise" could not wait until the ENGINEERING AND MINING JOURNAL had presented a complete and coherent account; so the thing was entrusted to somebody who doesn't know oil from gold, a well from a mill, or possibility from impossibility. Men and Brethren, is this wise?

The Britannia Iron Works.

IN our last issue we noticed the introduction into this country of the agricultural implements of these extensive English works. We also appended an account of the plant of the works of a company bearing the same name and situated near Bedford, England, under the supposition that they also belonged to the firm of JAMES and FREDRIC HOWARD. In this, we are informed by Mr. EVERETT, the agent for this company in this country, we were mistaken. The whole of the Bedford Works which this gentleman represents is occupied in the manufacture of steam and horse-power agricultural implements and steam boilers.

A Good Beginning.

IN the opinion of all who attended the first quarterly meeting of the American Institute of Mining Engineers, recently held at Wilkesbarre, that meeting was thoroughly successful. The new organization starts under favorable auspices, and we augur for it a career of usefulness and honor.

The election of DAVID THOMAS to the presidency is a deserved recognition of one of the American pioneers in a branch of industry combining mining and metallurgy—the manufacture of iron. His name will be a tower of strength to the young Institute. In the list of managers, we notice that the Columbia, Harvard, and Lafayette mining schools are represented. Sheffield is omitted, unless Mr. BLAKE, who is a New Haven man, will consent to stand for her; but Sheffield, we regret to say, has had, since Prof. ROCKWELL left, an empty chair in the department of mine-engineering.

The list of membership comprises at present only associates, as it was deemed wise to leave to the Council the task of dividing the professional from the non-professional names. All persons proposed hereafter will, however, be at once definitely elected as members or associates. The present list naturally shows a preponderance of Pennsylvania names, as the meeting was held in that State; and no names were admitted except those of persons who, either by their personal presence or by explicit declaration, had signified a desire to be connected with the Institute. It would have been easy to elect hundreds, who would probably be glad to join. Indeed, many were proposed by friends, who "had no doubt they would like to become members." But it was wisely preferred to wait for applications, and not to thrust membership upon anybody unasked. We trust that mining engineers (which includes, according to the Rules, metallurgists also) and others interested in the profession or the industry of mining, will at once make application. The provision that each candidate must be recommended by three members or associates and endorsed by the Council before election, is no more than prudent. It need not, however, in our opinion, hinder any one from making application who happens to be unknown to the present comparatively small number of members. By furnishing credentials or references, the requisite recommendations can doubtless be obtained. The next meeting will be held in August, at some point to be hereafter chosen by the Council, and duly announced. At that meeting we have no doubt that a very large addition will be made to the ranks. We advise all who feel inclined to benefit themselves and a good cause in this way, to apply at once to the Secretary, Mr. MARTIN CORYELL, of Wilkesbarre.

But the best proof of the practical value of this organization to the public, as well as the profession, is the manner in which it has at once attacked a problem of great national interest and importance, namely, the question of the economical extraction of coal. A suggestive discussion of the subject will be found in our report of the meeting, and the character of the committee appointed to consider it and report upon it at a future meeting, is such as to assure us of a tangible benefit to this industry from the deliberations and debates of the Institute.

The evils of the present systems of mining, preparing and shipping coal from the anthracite regions, are acknowledged by all who have examined the subject. Many reforms have been flippantly suggested; but the discovery of a feasible, as well as plausible, plan is not a simple matter. Great and complicated abuses are not easily remedied by a patch here and there; and the recommendations of engineers that coal operators shall do this, that, or the other, amount to little if they involve an immediate pecuniary loss. The Institute has sounded a clear and certain note of warning, and its advice will command attention. We rejoice that the committee which will continue the investigation comprises representatives of each of the great anthracite regions; and we look for a most valuable report on the subject.

It is certainly disgraceful that from fifty to sixty, or more, per cent. of the coal in our anthracite seams is irretrievably wasted. We hear much criticism on the loss of gold and silver in treating the ores of those metals; but the coal business, which presents no metallurgical difficulties, is carried on more wastefully than that of producing the precious metals, no matter by how rude a method. The American Institute of Mining Engineers already includes among its members the men most familiar with the causes of this evil, and most likely to suggest practicable remedies. From this class the committee was chosen; and if their report, and the discussions of it, shall effect a real improvement, the Institute will have inaugurated its career with the strongest proof of its value to the public.

The present time is specially appropriate to the consideration of this question. The protracted suspension of coal mining may be considered as about over. Wyoming and Schuylkill have resumed work, and Lehigh is on the verge of resumption. But, while the unthinking mass of men rejoice and are sanguine, or debate which party has won the victory in a struggle ruinous to both, the part of wisdom is to inquire thoroughly into the causes of the strife. They are not removed; they smoulder still, and they constitute a fruitful source of future loss and mischief. Without pretending to enter upon an exposition of the case, we may here remark that one trouble appears to be a maladjustment of prices. The miners complain; the operators complain; and the consumers complain. Now, it seems to us that a demonstrated waste of more than half the coal, in mining, breaking, and securing, must have something to do with the question, and that any practicable plan to avoid this loss will tend to mitigate present evils, as well as to delay or prevent greater ones that loom up before us. The mining engineers have the word; if they speak wisely, states men, capitalists, and laborers will be glad to listen.

Ventilation of Mines.*

To ventilate a mine properly, we must introduce, not only what air is necessary for the use of the workman, but also a sufficient volume to carry off the inflammable gases, which are constantly given off, sometimes in large quantities, and thus to secure the protection of both life and property, which is the means of an economical production.

It is important that proper attention should be given to the division and distribution of the air, so as to give each section of a mine its requisite quantity without waste, direct from the surface to the working sections, if possible avoiding all circuitous routes, until it passes into the return channel and thence to the surface.

Again, due consideration must be given to the construction of the different channels through which the air passes, that they may be protected against the effects of explosions, of fire, or any other accidents which are liable to occur in a mine, in order that the supply of fresh air may not be destroyed. It is important that, when men are working in mines of great depth; when their respiration, together with the combustion of lamps and gunpowder, and the accumulation of gases poison the atmosphere, that there be a free circulation of pure air without interruption, reaching every narrow passage where men may be at work. It is quite evident that, to ventilate economically, proper means must be applied to ventilate efficiently.

The methods adopted for ventilation are the natural and artificial systems. By the former method, the current is produced where there are two shafts or outlets communicating with the surface, and is caused by the difference of density between the air in the mine and that outside. When the mean temperature of the air in the longest shaft is less than that at the surface, the current of air will naturally be out through the short shaft, because the air in that shaft is lighter than that in the longer; and as the temperature at the surface approaches the mean temperature of the longer shaft, will the current of air diminish until the external temperature is the same as the mean in the shaft, when the circulation will have ceased altogether; and if the surface temperature be still further reduced, the longer shaft will become the greatest in temperature, and consequently the air in it lighter as the difference in temperature between the two shafts increase, when the ventilation will be reversed from the former. The air of a mine is more rare in winter, and more dense in summer than the atmosphere; consequently in summer the air will flow out of the lowest opening, while in winter it will be reversed and flow in at the lowest, and out at the highest opening.

The natural current will be much strengthened by the erection over the highest outlets of air stacks, usually about forty feet high. In mines of great depth, in which the temperature exceeds the mean at the surface, and is even equal to that of the greatest summer heat, a tolerably good natural circulation may be expected.

During the extremes of temperature, in winter and summer, the ventilation generally is good; but in the spring and autumn, when the air of the mine and the atmosphere are nearly of the same degree of temperature, it will not produce a current, and consequently the ventilation of the mine will be seriously affected by the accumulation of gases. The quantity of pure air passing into a mine by this system will depend upon the difference between the heat in the down-cast and up-cast shafts. Mines supplied by the natural system of ventilation become seriously deranged during the prevalence of storms and changes in the atmosphere. After a fall in the barometer, the gas expands and is discharged from every cavity and cell into which it was compressed, when it is extremely dangerous in the workings of a mine, owing to the quantity discharged being greater than at ordinary pressures. Upon such occasions it is, where the ventilation is insufficient, that serious explosions occur.

Fire-damp, or carburetted hydrogen, is the gas found in mines which, by its explosion, causes the loss of so many lives. It consists of two equivalents of hydrogen and one of carbon; its specific gravity is 0.555, and the weight of one hundred cubic inches is 16.92 grains. From the effects of an explosion of this gas in the Oaks colliery, England, 362 lives were lost. According to experiments, to cause it to explode it must be mixed with air, and must constitute from one-fifth to one-twelfth of the total volume, in which proportion it will be explosive in the highest degree. When one foot of gas is mixed with from 13 to 16 feet of air, the flame of a miner's lamp will become elongated, but, by increasing the proportion of air, the flame diminishes. It will require from 5 to 12 feet of air, mixed with one foot of the gas, to give it its greatest explosive power; but by increasing the quantity of gas, it will gradually become less explosive until the proportion of the gas is about one-third of the volume, at which mixture it will cease to ignite, and the flame of a lamp, by being thrust into it, will become extinguished.

This gas issues from the cells and cavities in the coal beds, often with a noise similar to that of boiling water, when the workings of the mine have reached the cavities in which it is compressed. In consequence of its being lighter than air (two feet of it weighing only a little more than one foot of air), it will make its way up and accumulate in the holes of the roof, and in the highest places in the mine. When it is ignited, it burns with a yellow flame, accompanied by a roaring noise, similar to that caused by the discharge of rockets, and continues burning, swaying to and fro. It is very elastic; three eet of it may be compressed into a space of one foot, and expanded, by removing the pressure, to about six feet or more. It is probable that a mixture of gas, just below the exploding point, would become explosive when suddenly compressed; and also that the shot fired by a miner is capable of producing this compression, and thus brings the gas to an explosive point, which, before the compression, had not been reached. This may take place in the vicinity of such a shot; and the fire that caused the sudden compression would ignite the gas around it; but this would occur only in an improperly ventilated mine. When gas explodes it is supposed to expand to eight times its original volume. From the results of experiments, it is estimated that the explosive effect of one foot of gas is equal to that of 0.26 pounds of powder; thus the effect of an explosion of 1,000 cubic feet of fire-damp would be equal to the effect produced by the discharge of 260 pounds of powder.

The temperature of the ignited gas is about 1,500°—a heat seven times greater than that of boiling water, or equal to that of iron heated to a bright red. The gas is converted by an explosion into *after-damp*, which is supposed to consist of eight parts of nitrogen, two parts of watery vapor, and one part of carbonic acid. The nitrogen being lighter than air, this mixture is considerably lighter than carbonic acid. This gas destroys life by suffocation. Thus it frequently happens that persons not killed by the explosion are suffocated by after-damp.

Carbonic acid gas, or black-damp, consists by weight of 6 parts of carbon united with 16 parts of oxygen. The weight of the gas is heavier than air, and on account of its greater specific gravity it has a tendency to accumulate in great quantity in low parts of mines and excavations. It is invisible; lights burn badly in air containing from 5 to 6 per cent. of it, and will become extinguished in air containing one-tenth; it is inexplosive, and unfit for respiration. Air containing 8 per cent. cannot be respired without great danger. The effect produced upon a person respiring this gas is similar to that of some poisons causing vomiting; and after being removed from it, the victim remains unwell for a considerable length of time, experiencing violent headache. Carbonic acid gas oozes from the fissures and cavities in the strata, or is given off by the respiration of the workmen and animals employed in a mine, and by the combustion of lights and of gunpowder. Upon the quantity of the above gases existing in a mine will depend the perils to which a miner is exposed. He may be burnt or killed by an explosion of gas, or suffocated by the effect of after-damp or black-damp; or fatal disease may be contracted by working in mines having a deficiency of pure air. Danger may also arise from the discharge of gas from old workings, mines may intersect each other in their workings, and in course of time be abandoned and allowed to fill up with gas which will accumulate, becoming a constant source of annoyance, and seriously interfere with the ventilation of a mine. Upon the prevention or removal of these embarrassments will depend the economical working of a mine; and it is evident that a liberal outlay of means in the arrangement and construction of a good system of ventilation, is an important element in securing a minimum cost of production.

The natural system being subject to atmospheric changes, and the method being dependent on the average temperature of the mine, compared with that of the external atmosphere, a condition constantly varying throughout the year, and therefore not permitting any certainty of action in the direction or quantity of air to be used for the ventilation of a mine, its use has been limited to shallow mines, where the resistance offered to the circulation of air is very small. The first application of artificial means of ventilatian was the fire-lamp, which was hung in the up-cast shaft, but the effect produced being very limited, it led to the adoption of the furnace, embodying the same priuciple upon a larger scale, whhich has been the system most generally adopted. It is commonly constructed at or near the bottom of the up-cast shaft, and by the heat produced it rarifies the air, which causes it to ascend, and thus creates a circulating current, the mine being continually supplied with fresh air through the down-cast shaft. The quantity thus circulating through the subterraneous passages of a mine will depend upon the extent of the workings, the area of the air-courses, and on the degree of heat produced by the furnace. As the heat is increased, the current of air becomes stronger, because the heat expands the air, and in this condition it becomes lighter. Moreover, the greater the volume of air heated by the furnace, the better will the ventilation be, since, in proportion to the volume of air expanded, will the weight of it in the up-cast be diminished, and a current produced. It is preferable to fix the furnace at the bottom of the up-cast shaft, notwithstanding the fact that the air in its upward passage from the furnace to the surface may be cooled and contracted a little; because the volume of heated air will be much greater, the furnace being at the bottom, than if fixed at the surface. In mines where the emission of gas is great, and where it is mixed with the return current of air on its way to the up-cast in sufficient quantity to raise the mixture to the fiery point, the current of air must be taken into the up-cast shaft by a different course than over the furnace, and not nearer than about fifty feet, so as to avoid all possibility of an explosion. In case the return current is near the fiery point, the furnace must be fed by a current of fresh air direct from the down-cast shaft, if possible, or by any other current which is known to be free from gas, and not liable to become impregnated with it. Regulating doors must be made at the outer end of such air-courses, for supplying the furnace, of dimensions in accordance with the necessity of the case, so as to allow the requisite quantity of air to pass through. The limit of the furnace, however, as a ventilating power is soon reached, where the resistance offered by a mine are heavy; when for economical effect the furnace is unable to compete with good mechanical ventilation. This fact led to the adoption of the fan. Of this class of ventilators, in order to meet the conditions under which the furnace failed to give sufficient ventilation, an example has been erected (Cradley Colliery, Staffordshire, England), 36 feet in diameter, and 12 feet in breadth, driven by a horizontal cylinder 30 inches diameter, and 30 inches stroke. The result of the operations of centrifugal fans, compared with the furnace, shows a saving of fuel equal to about 80 per cent. in favor of the former system. Another example of this class of ventilation has been erected (Belgium), of 40 feet diameter, and arranged to work at a speed of eighty revolutions per minute, producing a volume of 150,000 to 200,000 cubic feet of air per minute. There can be no doubt that the practical requirements in mine ventilation can be met by this class of ventilators, while for simplicity of construction, small liability to accident, and the little wear and tear to which their parts are subject, they cannot be surpassed. The best system of artificial ventilation that can be employed is that which will accomplish the greatest amount of work for one ton of coal consumed, so long as the ventilation compares favorably with any other in durability and cost of construction and operation, and so long as it can be adapted to all the varying conditions of a mine. To increase the volume of air in a mine in a given time requires the consumption of an increased quantity of fuel, owing to the resistance offered to the air by the friction against the sides; thus, twice the quantity of air requires four times the fuel, and four times the volume of air sixteen times the fuel. Hence the economy of fuel is of great importance. By the employment of the centrifugal fan-system, all the practical requirements in the ventilation of mines will be satisfied at less cost, and with greater useful effect than by any other means.

In considering the velocity to be given to a current of air propelled into a mine, it is necessary to know what rate may be adopted without a serious loss of power, resulting from friction, which increases as the square of the velocity. That this cannot be done with any degree of precision, is evident to any one acquainted with the variety of obstacles to be contended with—namely, the irregularity of the area, form, direction and length of air channels. As it requires four times the power to double the velocity of the air, it is preferable, therefore, to adopt a slow rate of speed in a mine. High velocities are extremely objectionable as well as inconvenient, owing to the loss from increased friction in passing through long, narrow, and winding air passages, and should be confined below ten feet per second. Even a lower rate might be preferable.

In the main gangways, and the main air channels, in which the whole of the air passes, sufficient sectional area should be given, if possible, to keep the velocity under five feet per second, as it is preferable to have a large volume moving slowly than have a small area and a high velocity. There may be occasions and situations, such as those in which large emissions of gas are taking place, when the large area of the main courses will permit a sufficient quantity of air to be circulated to carry off all inflammable gas, by a proper direction of the current. The sectional area of air-ways and passages should be as large as possible, consistent with the limits of economy, and increasing in area through the mine, in proportion as the air may be expanded by heat and loaded with gas, which gradually accumulates, and powder, smoke, and other impurities, which must be carried off, and the mine freed from their poisonous effects.

In order to retain the same velocity throughout the mine, and avoid an excessive loss of power from increased friction, the sectional area should be increased ·011 for every five degrees of temperature required by the air. Air courses should also be increased in sectional area, when the temperature is increased, and in proportion to the volume of gas and smoke which may be necessary to pass through them. Abrupt bends or angles in the air channels, on account of incessant friction, should be avoided, if possible, but when this is not practicable the section must be enlarged to admit a free passage.

The loss of power caused by friction of the air, is proportional to the angle. Thus, the friction caused in passing a 450 bend, is equal to half that caused in turning a bend of 90°; and a bend of 180°, or half a circle, occasions double the friction of the latter.

In a majority of cases, the sectional area of airways is too small; and in many no regard has been observed for the necessary increase to allow for the loss resulting from friction and other causes. When the fact that so many lives are lost, from the effect of bad ventilation, is taken into consideration, as well as the great progress which has been made in the development of mining enterprise, and the future demands of our coal-fields, the problem of ventilation must be recognized as second to none in importance among those to be solved by the mining engineers.

* A paper read May 18, 1871, at Wilkesbarre, Pa., before the American Institute of Mining Engineers, by Mr. DANIEL HOFFMAN, of Pottsville, Pa.

The Coal and Iron Fields of the South.

By G. W. ATKINSON, M. E.

COAL AND IRON FIELDS OF ALABAMA.

On the upper waters of the Black Warrior river in Alabama the coal measures are from eight to ten feet in thickness, yielding a pure, dry, hard and beautiful fuel. Alabama promises to be the great iron State of the future. Her coal deposits, though apparently inexhaustible, are not perhaps more vast than her iron beds, which are almost of every variety, viz., hematite, fossil (similar to the Juniata of Pennsylvania), honeycomb, and pipe ores. Carbonates or clay iron stones occur in the coal fields, and the whole series of red and brown oxides. Magnetic ores also occur in Alabama and yield a high percentage. They are so rich that metallic iron can be reduced from them in an ordinary smith's fire. The new railroad and river improvements now progressing rapidly in Alabama, connecting the Tennessee system of railroads and the Virginia Great Southern lines with the commercial cities and counties of the Gulf, are opening up this mining district heretofore unknown. Capital is looking to these attractive centres of the southwestern interior. I have heard experienced iron-masters declare that Alabama in coal, iron ores and fluxes, so valuable for the manufacture of iron and steel, was a far richer State than even Pennsylvania, with all her celebrity. They were men of experience and judgment, and had a personal knowledge of the

subjects discussed. The famous Juniata or "fossil iron ore" of Pennsylvania occurs in strata of wonderful thickness in Alabama and Tennessee. In some places it is from five to twelve feet thick, and is one of the best iron ores known to the world, yielding from forty to sixty per cent. of metallic iron. It occurs underlying thousands of acres, and is often so favorably placed that thousands of tons can be worked in open pits and drifted for half a mile, the bed lime regular, solid, and at good angles for drainage and carriage. A prominent iron-master residing at Chatanooga, who had a thirty years' experience in the manufacture of iron, mainly from "fossil ores" on the Tennessee river (the exact prolongation of the Alabama coal and iron fields to the north), forcibly impressed me with the value of the ore and the facilities for making iron in these southwest sections.

THE "CHATTANOOGA, MOBILE AND NEW ORLEANS RAILROAD,"

which is now just about being opened, and which affords direct through connection between New York and New Orleans, traverses the eastern portions of the coal, iron and limestone fields of Alabama, which in this State and Tennessee are more than 400 miles long and exceed 100 miles in width. Considerable activity has been noticed among the capitalists of the United States in the past few months by their investments in the material resources of this rich and beautiful southwest interior. For health and purity of climate, there is no part of America more desirable than the central and northern parts of Alabama. The gardens are blooming and bearing when it is mid-winter in New York State, and the population of the country has never been visited by either the cholera, yellow fever, or any other malady of the kind. A trip to Middle and Northern Alabama cannot fail to be interesting, instructive and delightful, and to seekers after good fortunes may prove eminently profitable. Land is cheap and titles are guaranteed.

The evenness and salubrity of the climates that prevail on our American continent between the thirty-second and thirty-sixth parallels of latitude, and extending from the Atlantic westward to the Pacific shores, have developed many valuable facts and discoveries on which the best medical practice now-a-days is based. Instead of feeble invalids being sent to Cuba, Florida, or other warm and enervating regions, they are directed to be taken to the genial and equalizing temperatures of the mountains in Alabama, Georgia, and Tennessee. Here there is perfect and constant protection against the chilling blasts and gloomy fogs and terrific "cold snaps" and blinding snow storms which, from Labrador and Newfoundland, sweep down along the Atlantic States like so many besoms of destruction for an aggregate of more than 225 days in the year. Bronchial, pulmonary, rheumatic, neuralgic, dyspeptic, and other human maladies proceeding from extreme and sudden climatic changes of the Northern States, rarely occur in the interlocked regions of the Southwest interior of our Union; and, as compared with Florida and the Indies on the South, and Minnesota and the Lake shores on the North, there is no doubt, in the opinion of the most experienced physicians of the United States but the old mountain climes of the Cherokees, the Appalaches, the Choctaws, and the Cahawbas, is the land of health, happiness, and longevity.

The objections which people accustomed to large cities urge against rural settlements in a remote interior, are happily now no longer applicable to the regions under notice. An "all rail" direct transit will in a few weeks from date of this writing, put passengers from New York into New Orleans inside of sixty hours! Numerous branch lines are operating by which rail and steamboat travelling is afforded for leaving the great Northeast and Southwest route at any desired point, to seek homes, business and investments in any and every direction, in either Tennessee, Georgia, or Alabama. To the Northern farmer, grazier, and cattle dealer, the beautiful region of vales, planes and slopes of the southern end of the Appalachian chain presents the most striking attractions. Here, in the high upland districts, elevated from 700 to 1500 feet above the ocean, and under "the sweet influences" which pervade the belt between the thirty-second and thirty-sixth parallels, cattle, horses, hogs and sheep *feed out all winter, and keep fat without "hand care," and are ready for market at any time in the year.* How vast a contrast with stock raising in New York, Canada, and the New England States! The finest horned cattle in America are raised in these mountain districts. The Kentucky blue grass, the rich weed, the pea-vine, the soft-cane, and other indigenous sorts of food for the domestic animals, so useful to man, who studies to utilize nature with the least expense of art, are the abundant products of these regions.

The importance of agriculture and stock raising to districts of country rich in mineral resources, and all those easy of development, is a fact obvious at a glance. When Alabama has her mines, mills, factories, forges, furnaces, foundries, and other branches of mechanical industry, under way, which have been inaugurated, and are now rapidly progressing, it is plain to see what convenient and profitable markets the husbandman will here have, and that, too, without the fear of western competition.

GEOLOGICAL POSITION OF COAL AND IRON IN ALABAMA, GEORGIA AND TENNESSEE.

The carboniferous system here reposes conformably on the silurean and devonian, the upper portions of the latter being the carboniferous limestone. Both this limestone and that which occurs from twelve hundred to sixteen hundred feet below it, constitute good fluxes for iron smelting. The traveller and scientific explorer in examining the country, for instance, will be supposed to begin his observations by commencing the ascent of some principal or highly elevated mountain. About the base he will see the silurean and devonian rocks in their heavy stratifications. Both the silurean and devonian here, contain valuable limestones and various metals—namely, iron, manganese, zinc, lead, etc. In the devonian system occurs the fossiliferous red oxide of iron, the equivalent of the Juniata ore in Pennsylvania, Maryland and West Virginia. The same ore is said to occur near Ithaca in the State of New York. In Tennessee, Georgia and Alabama, this bed has immense proportions, both as to thickness and territorial breadth. Lying sometimes flat, at others gently inclined, and again occasionally much tilted, it runs through the hills and mountains in continuous broad sheets, like leaves in a folded book. It occurs in limestone, and is therefore a rich calcareous ore, its thickness, varying, as before remarked, from five to twelve feet. In places it is but two to three feet, but is there often found in that bulk several times repeated, by the interpositions of limestone bands. In other localities it is a solid, continuous iron ore bed of five to eight feet, enlarging not unfrequently in certain districts to the extreme of ten and twelve feet. At an altitude of from five hundred to twelve hundred feet above the position of this ore, the mountain limestone appears, and at a height of one hundred to five hundred feet above this, is seen the general floor of these coal-fields. The thickness of the rock strata, just cited, differs in the various districts. The floor of these vast coal-fields is a coarse, silicious conglomerate, which has been referred to the "millstone grit," which constitutes the bottom rock of the coal-fields at the northern end of the Allegany chain. The rock at this—which may with some allowance be called the southern end—is not a combined mass of large pebbles, but is a white, coarse, well stratified sandstone, with alternate layers of the conglomerate making a part of it. The layers of pebble rock, or millstone grit, are usually not more than from one to five feet in thickness, and passing from one extreme to the other, a vertical section of a sandstone, conglomerate stratification will exhibit the conglomerate in the form of waves, as they might be pictured on a mountain wall.

The thickness of the flooring of the coal-fields has not been a matter of accurate research; and in truth the laws governing the deposition and relative thicknesses of all these sedimentary rocks in Tennessee, Georgia and Alabama, are peculiarly variable, and the figures applicable to one locality will not be suited to another, though the localities may be but a few miles apart.

THE COAL BEDS.

These, taking a wide view of the country, are from five to ten in number. The beds are from two to eight or ten feet thick. The coals are all semi-bituminous, and yet have diverse and desirable qualities. Some of them are highly carbonaceous, and are unexcelled for steam generation and for working in all the processes of metallurgy, from the smelting of ores to the refining of steel and welding of surfaces. Some of the coals are peculiarly adapted to gas-making; and samples seen on the upper waters of the Black Warrior resemble very closely the Newburgh orrel coal of Preston county, West Virginia, which is there shipped to Baltimore, three hundred miles by rail, for gas purposes and manufacturing, and is again shipped by rail and water to the other large Atlantic cities. The value of discovering and suitably providing an outlet for a superior gas-coal for the Southern cities and towns, and a coal which will also admirably answer either for domestic or factory use, is a thing of moment. The best gas-coal heretofore shipped from the South, is that of Richmond, Va.; but analyses and actual practical tests have proven the existence of such fuel in Tennessee, Georgia and Alabama, and in the regions now being opened by railroads and river improvements. No cannel coal has yet been discovered; but it is reasonable to suppose it may yet be met in the further researches which the immediate future will bring about. The coals of the Alabama fields yield sometimes as high as 75 to 87 per cent. of fixed carbon, which fact of itself shows how large a trade in ocean shipments may grow up in these districts, and how important to the Government it will be to have naval coal stations at points along the Gulf and elsewhere, if insular acquisitions should be determined on. The aggregate thickness of the coal system may be stated as varying like the rock strata, which have been described below them. Geological surveys in detail as to measurement have not been made in these regions, and although the several State Governments of Tennessee, Georgia and Alabama authorized examinations some years since under that head, which would no doubt have resulted in a better public knowledge of these matters, or in the collection of more facts among men devoted to these pursuits, the examinations did not long continue, and of course could only furnish a meagre outline of a subject which naturally is not mastered except by judicious outlays of time, skill and money.

The great coal shipping ports of the South, supplied from these regions, will be Charleston, Wilmington, Savannah, Fernandina, Cedar Keys, Appalachicola, Mobile, New Orleans and Galveston. The great centres of manufacture to be furnished with fuel for the industries which are now being planted there, will be Chattanooga, Decatur, Tuscaloosa, Selma, Montgomery, Columbus, Atlanta, Macon and Augusta. By late enactments of the Legislatures of Tennessee, Georgia, Alabama and Louisiana, respectively, charters were granted for the construction of railways and the improvement of rivers, which have caused a new era to dawn upon the prosperity and growth of these States. There are at present not less than twelve to fifteen hundred miles of new routes opened and in the course of opening, and in the period of the next five years there is every good reason to believe there will be complete and in running order not less than double that extent of transit lines by water and rail leading outward to the Atlantic and the Gulf.

The steamers of the North German Lloyd run between Bremen and New York, via Southhampton. Before the war broke out, which here likewise occasioned a great disturbance in the communication, two steamers ran weekly. This company owns twelve steamers of about 3,000 tons each. In 1870, fifty-six voyages were made in each direction, and 35,319 passengers forwarded—23,298 to, 8,021 from, America. The freights averaged 1,300 tons per steamer per voyage.

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CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

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Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

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For first Government fee, stamp, etc.	$16
our fee	$30 to 40
final Government fee	20
Total	$66 to $76

If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

We have engaged as solicitor and manager Mr. CHARLES ROGERS a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

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We can also furnish Models for use in the Patent Office, to parties who may desire it, as we have made arrangements for this purpose with one of the most skilful machinists in this country, who possesses every facility for getting up models in the most perfect manner, at short notice, and on reasonable terms.

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For attending to the obtaining of Reissues, Extensions, etc. and preparing Assignments, our charges vary according to the labor involved.

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Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 $40, being payable as soon as the application is ready to be sent to Washington.

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We shall give special attention to the prosecution of Rejected Applications, which have been improperly prepared by the inventor or incompetent attorneys.

We shall be ready at all times to furnish all necessary information and advice to intending applicants, and give our opinion as to the patentability of their inventions, free of charge; and we make it a rule never to take charge of a case unless we see a reasonable probability of obtaining a patent without first giving the inventor our candid opinion as to the probable result of the application.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

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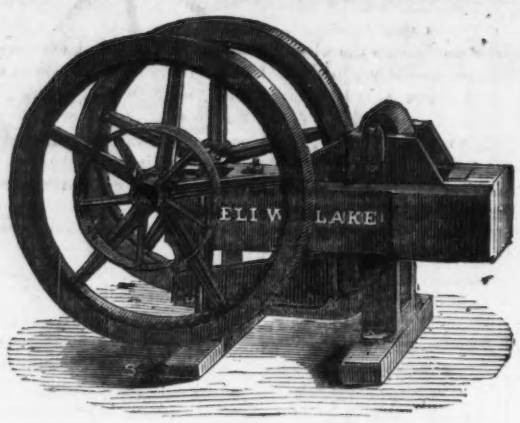

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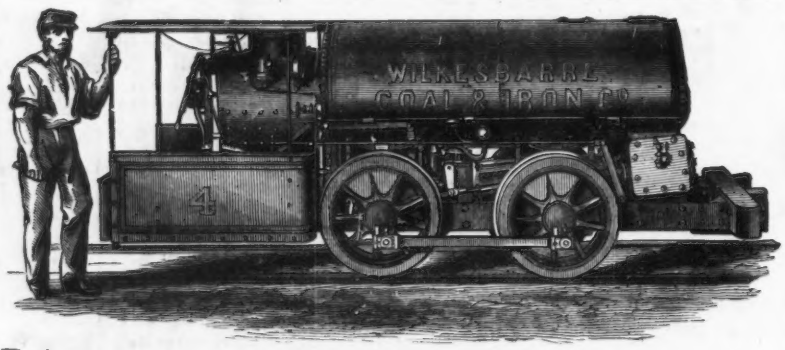

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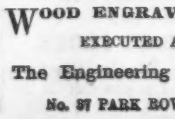

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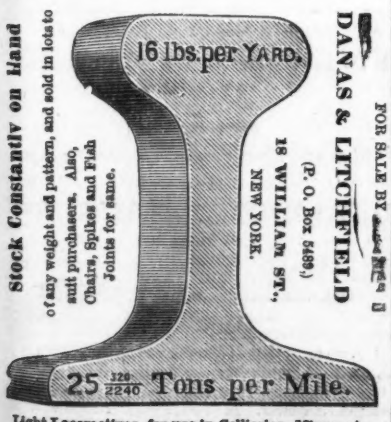

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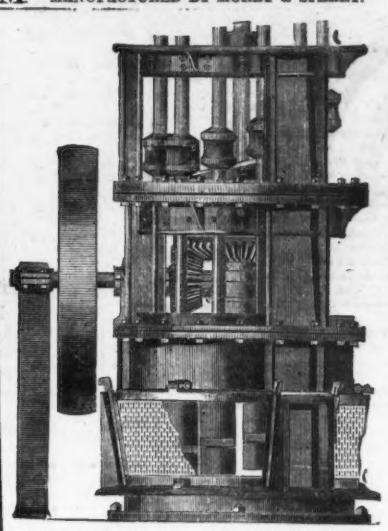

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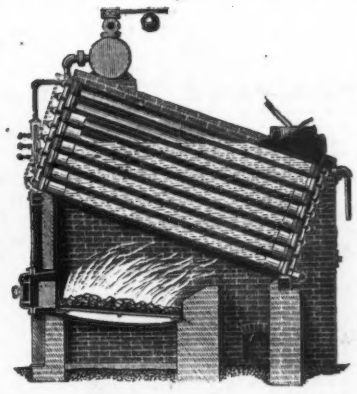

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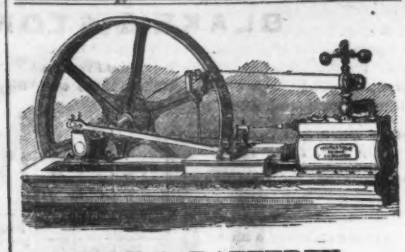

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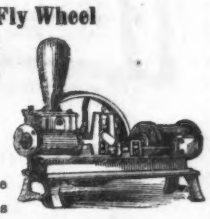

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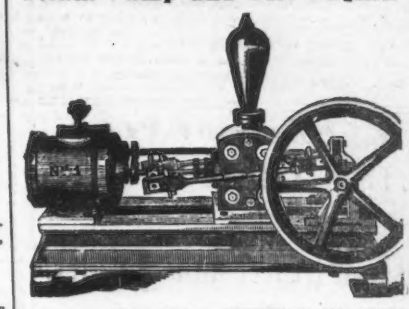

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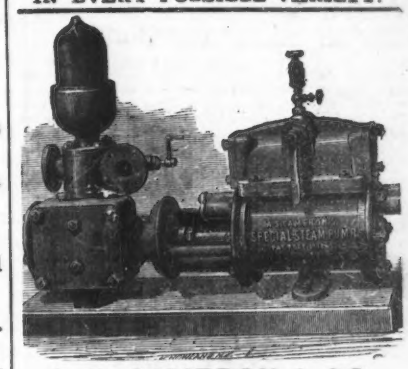

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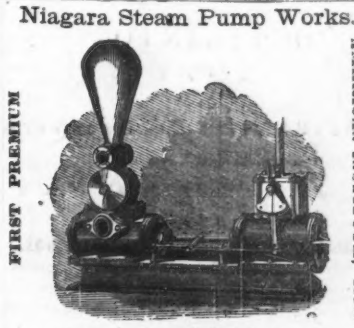

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131	—Velocipede for Boys	16 00	16	52
	FROM MCALLISTER.			
132	—Magic-Lantern, No. 433	20 00	30	95
	FROM H. THOMPSON.			
133	—An Easy Chair			
	FROM D. APPLETON & CO.			
134	—New American Cyclopædia, 16 vols	80 00	80	213
	FROM G. & C. MERRIAM.			
135	—Webster's Unabridged Pictorial Dictionary	12 00	15	45
136	—Webster's National Pictorial Dictionary	6 00	10	35
	FROM WESTERN & COMPANY.			
137	—One back vol. Manufacturer and Builder, unbound, postpaid	1 75	6	25
138	—Two back volumes Manufacturer and Builder, unbound, post-paid	3 50	11	37
139	—One back vol. Manufacturer and Builder, bound, postpaid	2 50	9	32
140	—Two back volumes Manufacturer and Builder, bound, postpaid	5 00	18	58
141	—Cover for binding the Manufacturer and Builder, postpaid	60	3	21
142	—A $10 Library (your choice from list in special sheet),	10 00	18	58
143	—A $15 Library, "	15 00	24	85
144	—A $20 Library, "	20 00	31	106
145	—A $25 Library, "	25 00	38	125
146	—A $30 Library, "	30 00	44	144
147	—A $35 Library, "	35 00	50	162
148	—A $40 Library, "	40 00	56	177
149	—A $45 Library, "	45 00	62	192
150	—A $50 Library, "	50 00	68	207
151	—A $60 Library, "	60 00	80	237
152	—A $75 Library, "	75 00	100	282
153	—A $100 Library, "	100 00	125	360
	All paid through by mail or express.			
154	—A choice of good Books (see terms in another column)			
155	—A choice of convenient Book-Cases (see special sheet)			
156	—A choice of popular Music (see terms in special sheet)			
157	—A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **75**, **99**, **101**, **105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154**, **156**, **157**, will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 36c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ⅜ in., 32c.; ½ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ¼ in., 21c.; ⅜ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do., 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chise. ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;=**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rosewood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for th boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple-plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs. HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two teapots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3½ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HENRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ¼ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45.53—Bailey's Patent Planes.—To those who have used these planes and know their value, is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer give carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	....14 in. long, 2	in. cutter.	
Fore "	.....18 " "	2⅜ " "	} Iron.
Jointer "	.....22 " "	2⅜ " "	

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $..50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operrtions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. FOST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, twe rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmansip, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $800, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incumbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4½ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair,

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co.**, 495 Broadway, New York; **Florence Sewing Machine Co.**, 505 Broadway, New York; **Wilcox & Gibbs Sewing Machine Co.**, 658 Broadway, New York; **Singer Sewing Machine Co.**, 458 Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of number for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *post-paid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

SPECIMEN COPIES, CIRCULARS, SHOW BILLS, etc.,

will be furnished free of charge in sufficient quantities to meet the reasonable requirements of agents. We would respectfully request that they do not waste them, but distribute them judiciously. If some unexpected event should prevent them from continuing the business, they will do the square thing by us by giving their outfit to some friend, who will continue the business where they have left off; and who will no doubt be grateful for the opportunity of receiving profitable employment.

Postage.

Every subscriber pays his own postage at the office where he receives the paper. This is only twenty-four cents per year, or six cents per quarter, payable in advance.

Don't Give up Your Town

until everybody has been supplied with a circular and has had a chance to subscribe; and be sure that you leave your address, so that they may know where to find you in case they should make up their minds to take the magazine after you have left them. Make all drafts, money-orders, and registered letters payable to the order of Western & Company, publishers, and address all communications

WESTERN & COMPANY, Publishers,
NO. 37 PARK ROW, NEW YORK.

TABLE OF CASH PREMIUMS For 1871.

EVERY MAN HIS OWN PAYMASTER.

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			PREMIUMS. At $1 50 each.	PRE At $1 00 each
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" " "	*40*	"	24 00	4 00
" " "	*50*	"	32 50	7 50
" " "	*75*	"	48 75	11 25
" " "	*100*	"	65 00	15 00
" " "	*200*	"	140 00	40 0
" " "	*500*	"	350 00	100 00
" " "	*1000*	"	700 00	200 00

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It often happens that clubs are made up of numbers that are not found in the above table. Names may be added to clubs at the following rates:

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" "	*10*	" "	*15*	.. 1 20	" "		
" "	*15*	" "	*20*	.. 1 10	" "		
" "	*20*	" "	*30*	.. 1 00	" "		
" "	*30*	" "	*40*	.. 95	" "		
" "	*40*	" "	*50*	.. 90	" "		
" "	*50*	" "	*200*	.. 85	" "		
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" "	*500*	" "	*1000*	.. 80	" "		
" "	*1000*	and over.....		80	" "		

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

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jan1-1y

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In every variety.

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In cases and details.

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Also, a very large stock of choice and rare chemicals, and glassware for use in laboratories. may23

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TRANSFERS OF MONEY TO EUROPE AND THE PACIFIC COAST BY TELEGRAPH.

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PATENTS—No. 76,499, April 7, 1868.. No. 96,465, Nov. 2, 1869.
No. 93,113, July 20, 1869 No. 106,606, Aug. 23, 1870.
No. 94,969, Sept. 21, 1869 No. 106,607, Aug. 23, 1870.

Address GEORGE N. MOWBRAY, NORTH ADAMS, MASS.

[Feb. 21, 3m.]

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Advertisements admitted on this page at the rate of 40 cents per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

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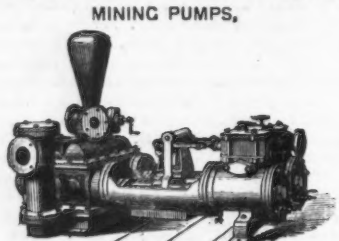

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BLASTING POWDER,

SAFETY FUSE,

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EQUAL IN STRENGTH TO NITRO-GLYCERINE.

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Asbestos Roofing

FIRST PREMIUM awarded by the AMERICAN INSTITUTE EXHIBITION of 1870.

"This improved Roofing is strong and flexible, unaffected by the sun's heat, practically water proof, *and is really an article of the first order of merit.*"

Signed, { HORACE GREELEY, Pres. / GEO. PEYTON, Rec. Sec. / SAM'L D. TILLMAN, Cor. Sec.

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Is a fibrous waterproof material, prepared ready for use, which can be applied with a brush, and forms an elastic felt-like covering of any desired thickness. It is particularly valuable for restoring and preserving old shingle, tin, felt, and other roofs.

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Gave 5 **Per Cent.** better results at the **Lowell Test** than any of its **Highly Polished Competitors.**

It will give from 30 to 100 per cent. more power in proportion to its size, than any other wheel.

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Send for report of tests, with description and diagrams.

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Adapted to Mechanical Purposes,

Invite the attention of all who are interested in the sale or use of such articles to the high standard quality and low prices of their various manufactures, comprising

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"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.

PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

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Price lists and further information may be obtained by mail or otherwise on application.

oct30-1y-os

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PEEKSKILL, NEW-YORK.

Fire Brick Works.

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Blocks and Tiles for all Purposes.

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Stove and Range Linings of every description to order. nov1:1y

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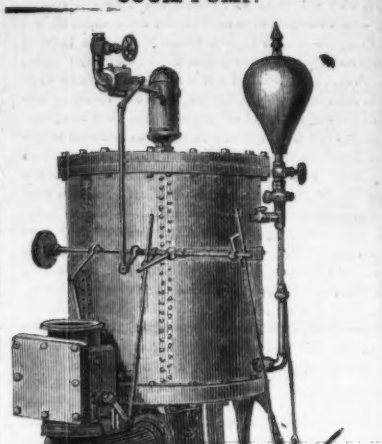

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Send for Illustrated Circular. feb22 6m

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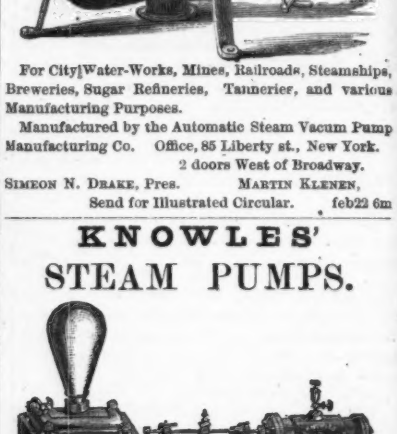

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KNOWLES & SIBLEY,

Warehouse. 90 and 92 Liberty st.,

NEW YORK

Works at Warren, Mass.

ap:18:3mos

DEPARTMENT OF PUBLIC WORKS, 237 BROADWAY.

TO CONTRACTORS.

Proposals, enclosed in a sealed envelope, with the title of the work and the name of the bidder endorsed thereon (ALSO THE NUMBER OF THE WORK, AS IN THE ADVERTISEMENT), will be received at this office until Monday, May 29th, 1871, at 11 o'clock A. M., for the following works:

1. For paving Thirty-first street, from Second avenue to East River, with Belgian pavement.
2. For paving Fortieth street, from Madison to Third avenue, with Belgian pavement.
3. For paving Hubert street, from Hudson to West street, with Belgian pavement.
4. For paving Franklin street, from West Broadway to West street, with Belgian pavement.
5. For paving Watts street, from Canal to West street, with Belgian pavement.
6. For sewer in Seventy-second street, between Avenue A and First avenue.
7. For sewer in Water street, between Governeur and Jackson streets.
8. For sewers in Hudson street, between Bank and West Twelfth street, and between Horatio and Gansevoort streets.
9. For sewer in Fifth avenue, between Thirty-second and Thirty-third streets.
10. For regulating, grading, curb, gutter, and flagging Sixty-fifth street, from Ninth to Tenth avenue.
11. For regulating, grading, curb, gutter, and flagging Forty-seventh street, from First avenue to East River.
12. For flagging Fifty-first street, from Broadway to Eighth avenue.
13. For flagging Seventieth street, from Third to Fourth avenue.
14. For flagging Seventy-seventh street, from Third to Fifth avenue,
15. For furnishing this Department with 400 granite and 100 bluestone basin-heads and their appurtenances.
16. For furnishing this Department with 600 cast iron manhole frames and covers.

Blank forms of proposals, the specifications and agreements, the proper envelopes in which to enclose the bids, and any further information desired, can be had on application to the Contract Clerk at this office.

WILLIAM M. TWEED,
Commissioner of Public Works.

NEW YORK, May 17, 1871. my23,2t

DEPARTMENT OF PUBLIC WORKS, COMMISSIONER'S Office, No. 237 Broadway.

Proposals, enclosed in a sealed envelope, endorsed "Proposals for water-pipe," with the name of the bidder written thereon, will be received at this office until Thursday, May 18, at 11 o'clock, A. M., for furnishing this department with cast-iron water-pipe.

Blank forms of proposals, specifications and agreements can be had on application at the office of Chief Engineer. WILLIAM M. TWEED,
Commissioner of Public Works.

NEW YORK, May 5, 1871 my23,3